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AND

TRANSACTIONS.

VOLUME XVI.

1856-57.

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CONTENTS.

VOL. XVI.—1857.

No. I.

The Registers of the Pharmaceutical Society, page 1—The Botanical Prize, 2—The Last Edition of the Medical Bill for Session 1856, 3—Palmer's Trial and the Result, 5.

Transactions of the Pharmaceutical Society: Election of President and other Officers, 12—Pharmaceutical Meeting—Donations to the Library, 12—Introductory Remarks on the Chemistry of Poisons and Pharmaceutical Education, 12—The Distilled Waters of the Pharmacopœia. Mr. Haselden, 14—Rhatany Root. Mr. Hanbury, 16—Oxide of Zinc. Mr. Morson, 17.

Provincial Transactions: Liverpool Chemists' Association—The Preservation of Fresh Meat. G. Hamilton, Esq., 17—On Strychnia. J. B. Edwards, Ph. D., 20—Manchester Pharmaceutical Association—Meeting and Election of Officers, 21.

Original and Extracted Articles: On the Practical Examination of the Quinine Salts. Mr. Giles, 22—The Chemical Tests for Strychnia. Mr. Copney, 23—Pump Water, 26—Well Water (Analysis). Dr. Thomson, 27—On Rhatany Root. Dr. Schuchardt, 29—On Chinese Alum, 32—Goodhall's Patent Grinding and Levigating Machine, 33—Preparation of Aluminium, Sodium, Chloride of Aluminium, &c. M. Deville, 34—Catechu and its Acids. D. C. Neubauer, 39—Chemical History of the Fats (*continued*), 41—Action of Alum upon Red Wines. Lassaigne, 43—On some of the Productions of the Rhio-Lingga Archipelago. Lieut. D. B. Kops, 43—Medicine in Turkey, 44—The Medicine Stamp, 45—Pharmacy in the Crimea—Correspondence, 45—Raffle for a Business at Liverpool, 48—*Books Received*, 48—*Correspondents*, 48—List of Members, Associates, and Apprentices, 49.

No. II.

The Registers of the Pharmaceutical Society, 105—Proceedings under the Apothecaries' Act, 105—Bradford County Court, 106—Illegal Weights—The Westminster Stamp and Westminster Law, 108—The Progress of Pharmacy in Birmingham, 109—The Limited Liability Mania, 110—The Leeds Poisoning Case—Dove, 115—The Sale of Poisons, 117.

Transactions of the Pharmaceutical Society: List of Members, Associates, and Apprentices, 119—North British Branch—Lecture on Strychnine. Dr. Macadam, 120.

Original and Extracted Articles: Aloine. Mr. T. B. Groves, 128—The Mutual Action of Chromic Acid and the Volatile Oils. J. T. Plummer, Ph. D., 130—Rhatany Root. Dr. Schuchardt, 132—Composition and Analysis of Milk, 135—English Oak Galls. Dr. Vinen, 137—Silvering and Gilding Glass, 138—Testing Various Substances by Chromate of Potash and Sulphuric Acid. M. Eboli, 140—Explosive Action of Sodium on Water. F. W. Griffin, Ph.D., 141—Solution of Gutta Percha. J. M. Maisch, 142—Solubility of Bone in Water. Wöhler, 142—Syrupus Ferri Iodidi, 143—Liquor Cotyledon Umbellici, 143—The State of Medicine in Persia, 143—Report of Committee on Standards for Drugs. American Pharmaceutical Association, 144—Report of Committee on Home Adulterations. Ditto, 145—London Vegetation *v.* London Smoke, 146—Bristol Royal Infirmary, 147—Alleged Poisoning by Antimony, 147—Court of Queen's Bench, Guildhall—Recovery of Fees. Crane *v.* Voules, 148—Royal Institution—Process for Silvering Glass. Prof. Faraday, 149—Donation to the Museum of the Pharmaceutical Society, 152—*Correspondents*, 152—Errata, 152.

No. III.

The Adulteration of Food, Drugs, &c.—Result of the Parliamentary Inquiry, 154—A Licence in Pharmacy, 156—Cruel Experiments, 158.

Transactions of the Pharmaceutical Society: North British Branch—Supplement to the Lecture on Strychnine. Dr. S. Macadam, 160.

Original and Extracted Articles: The Botany of the Crimea. Mr. Moss, 163—Effects of the Presence of Sulphur in Coal Gas. Mr. Griffiths, 166—Medicinal and Physiological Action of Carboazotic Acid. F. C. Calvert and Dr. Moffatt, 167—Report on the Results of Physical and Chemical Investigation, and Applications in the Arts. B. H. Paul, Ph.D.: Specific Heat of Elementary Substances—Allotropism of Selenium—Ozone—Equivalent of Antimony—Salts of Sesquioxide of Manganese—Lactic Acid in Extract of Taraxacum—Veratria—Ferrocyanide of Potassium—Paracyanogen—Action of Heat on Sulphocyanide of Potassium—Adipocere—Phaseomannite—Coumarine—Urea—Formic Acid—Carbonic Oxide—Testing for Iodine—Wash-Bottle—Preparation of Phosphorus—Assay of Galena and Sulphide of Antimony—Estimation of Copper, 168—Twenty-sixth Meeting of the British Association—Testing for Strychnia, Brucia, &c. Mr. Horsley, 177—Extraction of the Alkaloids from Nux Vomica without Alcohol. Ibid., 179—Experiments on Animals. Ibid., 179—Post-Mortem Researches for Strychnia. Ibid., 181—The Manufacture of Iron and Steel without Fuel. Mr. Bessamer, 182—Report of the Parliamentary Committee on the Adulteration of Food, Drugs, &c., 185—Royal Institution—The Cleavage of Crystals &c. J. Tyndall, Esq., 192—Medical Patronage, 195—Accidental Poisoning by Laudanum, 195—Unsuccessful Attempt to Poison a Husband, 196—Poisoning by Antimony, 197—Dove's Confession, 198—Spontaneous Combustion (?), 198—*Books Received*, 199—*Correspondents*, 199—Case of Imposition, 199—Adulterated Pepper, 199—Essence of Rennet, 199—Pulvis Bismuthi Compositus, 200.

No. IV.

A Passing Sketch of the State of Pharmacy in France and in Great Britain—The Licence in Pharmacy, 201—Pharmacy in Italy—The Limitation of the Number of Shops—The Sale of Poisons, 205.

Original and Extracted Articles: On the Tree Producing the Red Cinchona Bark (*with cut*). John Eliot Howard, Esq., 207—Determination of Theine in Guarana. J. Stenhouse, LL.D., F.R.S., 212—Note upon a Green Dye from China. Mr. Daniel Hanbury, 213—On Unguentum Hydrargyri. John Higginbottom, F.R.S., 214—Report of the Results of Physical and Chemical Investigation, and Applications in the Arts. B. H. Paul, Ph.D.: Production of High Temperatures—Production of Cyanogen Compounds—Preservation of Yolk of Egg—Purification of Soda from Sulphur—Production of Photographs by Artificial Light—Casein Cement—Cobalt Green—Preparation of Ammonia—Preservation of Solution of Gallic Acid—Presence of Cyanogen in Carbonate of Soda, 215—On the Chemical Type Ammonia. Dr. Hofmann, F.R.S., 224—Chemical Report on the Mode of Detecting Vegetable Substances mixed with Coffee. Professor Graham, Dr. Stenhouse, and Mr. Dugald Campbell, 228—On Erythrophleum Judiciale (the Sassy Bark Tree of Cape Palmas (*with cuts*). Mr. William Procter, Jun., 233—Royal Institution—The Cleavage of Crystals, &c. (*concluded*). J. Tyndall, Esq., 237—The Early Closing Movement—Chemists' Assistants, 242—Spontaneous Combustion (?), 243—Sale of Poisons, 244—Accidental Poisoning by Strychnine, 246—Accidental Poisoning by Black Drop, 246—Poison by Mistake, 246—*Books Received*, 247—*Correspondents*, 248.

No. V.

Medicine and Pharmacy in Switzerland—Board of Health—The Faculty of Medicine—Colleges of Medicine, Surgery, and Pharmacy—The Examinations—The Practice of Pharmacy—Officers of Health—The Sale of Poisons—Secret Medicines—The Veterinary Art, 249—Legislation against Poisoning, 254—The Sale of Poisons, 256—The Rising Generation of Pharmaceutists, 261.

Transactions of the Pharmaceutical Society: The Council of the Pharmaceutical Society on the Education of Dispensers of Medicine and the Sale of Poisons, 263—List of Members, Associates, and Apprentices (*continued*), 266—Pharmaceutical Meeting—

Distribution of Prizes, 266—In Chemistry and Pharmacy, Botany and Materia Medica, 267—Description of a Collection of American Drugs, presented by Mr. Procter, Jun., 268—Duroy's Anæsthesimeter. Mr. Wood (*with cut*), 274—Detection and Quantitative Estimation of Quinine when combined with Fatty Oils. Mr. Bastick, 277—Fly Papers, 278—Penghawar Djambi, a new Styptic. D. Hanbury, 278—Phytological Club, 281—North British Branch—Announcement of Lectures, 281.

Provincial Transactions: Liverpool Chemists' Association—Annual Meeting, 281—Manchester Pharmaceutical Association, 284.

Original and Extracted Articles: The Behaviour of Mercury in Thermo-Electric Batteries. W. Symons, 285—Effects of the Presence of Sulphur in Coal Gas. Mr. L. Thompson, 286—On Caseine Cement. Professor B. Wagner, 288—Poisoning by Sulphuric Acid, 288—Angular Bottles and Pots ordered in the Dublin Pharmacopœia, 289—On the Supplement to the Dublin Pharmacopœia. John Grattan, 289—Two Cases of Poisoning. Mr. Howard Hopley, 291—Attempted Suicide by Laudanum, 292—Attempt to Poison Witnesses on a Trial, 293—Suicide, 293—Suicide by Oil of Bitter Almonds, 294—Poisoning by Sulphate of Potass, 296—*Books Received*, 296—*Correspondents*, 296.

No. VI.

Pharmacy in America, 297—Studious Habits—The Experiment, 300—The Dental Profession, 301.

Transactions of the Pharmaceutical Society: Pharmaceutical Meeting—Donations to the Library and Museum, 304—The Characters of Dandelion Root, and the Means of Distinguishing it from other Roots. Mr. Bentley, 304—Egusé Oil—from West Africa. Dr. Daniell, 307—Crystallized Hydrate of Barytes. F. Mohr, Ph.D., 309—The Root of Aconitum Heterophyllum. Mr. Hanbury, 311—Test for Narcotine. Mr. Macfarlane, 312—The Sale of Poisons, 313—Phytological Club—Meeting, 316—North British Branch—Meeting—Address of the President, 316.

Provincial Transactions: Liverpool Chemists' Association, 318—Manchester Pharmaceutical Association, 318.

Original and Extracted Articles: One Thing Forgotten. Mr. Joseph Ince, 319—The Position of Sodium in the Thermo-Electric Scale. Mr. Gore, 321—The New Styptic, Penghawar Djambi. Mr. Archer, 322—The Effects of the Presence of Sulphur in Coal Gas. Mr. F. W. Griffin, 323—Report of the Results of Physical and Chemical Investigation and Applications in the Arts. B. H. Paul, Ph.D.: Production of Iron—Mercurial Minimum Thermometer—Purification of Alcohol—Preparation of Styracine—Precipitation of Salts from Solution—Lake Colours—Production of Ferrocyanides—Vulcanized Caoutchouc—Soap—Treatment of Fats and Oils—Stopper for Bottles, 327—Note on Wood Oil. M. Guibourt, 332—Oil of Cotton Seed. Mr. E. S. Wayne, 335—Ioduretted Glycerine in Skin Diseases, 336—Liquidambar Styraciflua. Dr. Wright, 336—Florida Indigo, 337—Electro-Chemical Engraving. M. Dericenzi, 337—Report on the Inspection of Drugs at Baltimore, 338—The Vaporateur. Mr. Salt, 339—Poisoning by Opium in China, 340—Suicide by Laudanum, 340—Suicide by Laudanum and Oil of Bitter Almonds, 341—Poisoning with Opium, 341—Attempted Suicide by Laudanum, 341—Liverpool Museum of Applied Science, 342—Odontological Society, 342—Society of Dentists, 343—*Books Received*, 344—*Correspondents*, 344.

No. VII.

The Students' Grievance, 345—Precautions against Accidents—from Poison, &c., 347—The Dispensing of Medicine in the Army, 348—The Dental Profession, 352.

Transactions of the Pharmaceutical Society: The Pharmacopœia Committee, 353—List of Members, Associates, and Apprentices (*continued*), 353—Conversazione, 354—Phytological Club—The Circulation of Sap. Mr. Grundy, 355—North British Branch—Meeting, 356—The Manufacture of Iron. Dr. Macadam, 356—Napicrean Machine. Mr. Mackay, 357.

Provincial Transactions: Liverpool Chemists' Association—Meetings, 359—The History of the White Poppy and Opium, 359—Conversazione, 359—Manchester Pharmaceutical Association, 362.

Original and Extracted Articles: Decolourizing Charcoals and their Power of Absorbing Gases. J. Stenhouse, Ph.D., 363—On the Copals of Western Africa. Dr. Daniell, 367—The Sassy Tree of Western Africa. Dr. Lindley, 373—Note on Wood Oil. Dr. De Vry, 373—Report of the Results of Physical and Chemical Investigation and Applications in the Arts. B. H. Paul, Ph.D.: Estimation of the Density of Solids—Law of Absorption for Ammonia—Crystalline Form, &c., of Selenium and Iodine—Action of Water on Glass—Detection of Arsenic and Antimony—Decomposition of Uric Acid—Hydraulic Mortar—Prevention of Stoppage in Drain Pipes—Sulphide of Iron—Alizarine Ink, 374—Effects of the Presence of Sulphur in Coal Gas. Mr. L. Thompson, 379—Another Thing Forgotten. Mr. Collins, 382—There is no Time. Mr. Haselden, 384—The Value of Time, 385—The Education of Apprentices, 386—Education of Apprentices—Apology for Assistants. Mr. Giles, 387—Adulteration of Calamina Preparata, 388—Poisoning by Strychnia—Recovery, 389—The Odontological Society—Council and Officers, 390—College of Dentists—Council and Officers, 390—*Obituary:* Dr. Paris, President of the College of Physicians, 390—*Review:* The Art of Perfumery. W. S. Piesse, 391—*Books Received*, 392—*Correspondents*, 392.

No. VIII.

Professional Responsibility, 393—The Income-Tax—Its Pressure on Professions and Trades, 395—The Dental Profession, 396.

Transactions of the Pharmaceutical Society: Pharmaceutical Meeting, 398—Donations to the Library and Museum, 398—On Cœlocline Polycarpa, the Berberine, or Yellow-Dye Tree of Soudan. Dr. Daniell, 398—On Quinidine. Dr. De Vry, 401—Iodide of Antimony, 402—Extract of Liquorice, 403—Phytological Club—Fourth Annual Meeting, 405—North British Branch—Meeting—Methylated Spirit and its Preparations. Mr. Macfarlane, 406—The Present State of Pharmacy in America. Mr. J. Ray, 412.

Provincial Transactions: Liverpool Chemists' Association—Meeting, 415—Slow Poisoning by Antimony, 415—Poisoning by Arsenic, 417.

Original and Extracted Articles: On Storax. Daniel Hanbury, 417—On the Copals of Western Africa (*continued*). Dr. Daniell, 423—Amylene. Dr. Snow, 427—Report of the Results of Physical and Chemical Investigation and Applications in the Arts. B. H. Paul, Ph.D.: Production of Stearine and Oleine—Separation of Fat from Soap-suds—Estimation of Acids in Coloured Liquids—Production of Tartaric and Citric Acids—Estimation of Phosphoric Acid—Preparation of Matches—Volumetric Analysis—Action of Oxides of Nitrogen on Iodide of Potassium and Starch, 429—Meteorological Report—Paddington. Mr. Copney, 432—*Obituary:* Dr. Ure, F.R.S., &c., &c., 437—*Books Received*, 439—The Serious Illness of the Secretary of the Pharmaceutical Society, 439—*Correspondents*, 439.

No. IX.

The Medical Bill for 1857, 441—The Dental Profession, 443—Boy Dispensers, 445.

Transactions of the Pharmaceutical Society: List of Members, Associates, and Apprentices (*continued*), 446—Pharmaceutical Meeting—Donations to the Library and Museum, 447—Panna, or Radix Uncomocomo. Dr. Th. Martius, 447—The Detection of Strychnia in cases of Poisoning. Dr. De Vry, 448—Sesquioxide of Iron. Mr. Allchin, 452—Sweet Spirit of Nitre from Methylated Spirit, 453—Phytological Club—Microscopical Examination of the Tissue in Coal. Mr. Tupholme, 454—North British Branch—Meeting—The Effects of Inhaling Sweet Spirit of Nitre, 455.

Provincial Transactions: Liverpool Chemists' Association—Meeting—On Crystallization. Mr. Samuel, 459—Products of the Nat. Order Leguminosæ. Mr. Archer, 459—Manchester Pharmaceutical Association—Meeting, 460.

Original and Extracted Articles: On Storax. Daniel Hanbury, 461—The Amoma of Western Africa. Dr. Daniell, 465—On Pepsine. Mr. W. S. Squire, 472—Report of the Results of Physical and Chemical Investigation and Applications in the Arts. B. H. Paul, Ph. D.: Estimation of Oxide of Lead—Self-acting Washing Bottle—Solubility of Oxalate of Lime in Phosphoric Acid—Organic Acids in Mineral Waters—Detection of Cotton in Woollen Fabrics—Gold in the Form of Malleable

Sponge—Substitute for Felspar—Alkalimetric Solution—Detection of the Adulteration of Potashes and common Salt, 475—Production of Ice by Evaporation of Ether in Vacuo. Mr. Harrison, 477—Meteorological Report—Paddington (*concluded*). Mr. Copney, 479—Accidental Poisoning by Prussic Acid, 484—Accidental Death from Laudanum, 485—Suicide by Strychnine, 485—Suicide by Opium, 485—Camphor an Antidote to Strychnine, 486—College of Dentists, 486—*Books Received*, 487—*Correspondents*, 488.

No. X.

Poor-Law Medical Relief, 489—The Educational Functions of the Pharmaceutical Society, 492—Botany, 494.

Transactions of the Pharmaceutical Society: Financial Statement, 495—List of Members, Associates, and Apprentices (*continued*), 496—Members of Council in Office by Lot, 496—Pharmaceutical Meeting—Donations to the Library and Museum, 496—On the Toxicology of Strychnine, 497—The Urari, or Arrow Poison of Guiana. Sir R. H. Schomburgh, 500—Phytological Club—Meeting—On the Fossil Vegetation of the Coal Measures. Mr. T. Greenish, 507.

Provincial Transactions: Liverpool Chemists' Association—The Production, Preparation, and Assaying of Copper. Mr. N. Samuelson, 509—On the Sale of Poisons. Mr. T. Lowe, 509.

Original and Extracted Articles: On the Amoma of Western Africa (*concluded*). Dr. Daniell, 511—On the Manufacture of the Chinese Green Dye. The Rev. M. Hélot, 517—Chemical Report on the Adulteration of Coffee (*concluded*), 521—Colchicine. L. Oberlin, 529—Decomposition of Nitrate of Potash by Charcoal. A. Vogel, Jun., 529—Production of Mannite by Marine Plants. T. L. Phipson, 530—Writing Ink in Cakes, 531—Staining Bone and Ivory. Dr. J. C. Kellermann, 531—Decomposition of Solution of Acetate of Morphia. Mr. Wood, 531—Pecuniary Value of Human Life, 532—Poisoning by Arsenic in China, 532—Royal Institution, 532—Conservation of Force. Professor Faraday, 533—*Books Received*, 535—*Correspondents*, 536.

No. XI.

Medical and Pharmaceutical Jurisprudence, 537—The Approaching Anniversary of the Pharmaceutical Society, 539.

Transactions of the Pharmaceutical Society: List of Members, Associates, and Apprentices (*continued*), 540—Pharmaceutical Meeting—Donations to the Library and Museum, 540—The Detection of Strychnia. Dr. Garrod, 541—The Medicinal Preparations of Arsenic. Mr. Haselden, 541—Knight's Soda-Water Apparatus (*with cuts*), 543—North British Branch—Pharmaceutical Meeting, 545—Notice of some French Pharmaceutical Specialities. Mr. Kemp, 545—Improved Mode of Coating Pills. Mr. Baildon, 546—The Annual Meeting—Report of the Council, 547—The Annual Dinner, 550.

Provincial Transactions: Liverpool Chemists' Association—On the Conservation of Force. G. Hamilton, Esq., 551—Microscopical Examination of Cinchona Bark. Mr. H. S. Evans, 553.

Original and Extracted Articles: On the Manufacture of the Chinese Green Dye (*concluded*), M. Hélot, 553—Siam Cardamoms, 556—Genuine Bread without Alum, 556—Detection of Alum in Bread, 557—Alum in Bread. Mr. Reynolds, 559—On the Use of Alum in Making Bread, 559—Composition of Wheat Grain, its Products in the Mill and Bread, 561—Report of Results of Physical and Chemical Investigation and Applications in the Arts. B. H. Paul, Ph.D.: Ferrum Reductum—Dye Pigment from Quercitron Bark—The Halogens—Caustic with Gutta Percha—Consumption of Soap—Molybdic Acid—Nuisances from Soap and Tallow Works—Black Ink—Chærophyllum Bulbosum—Pyrogallic Acid—Relations of Gold and other Metals to Light, 565—Austrian Pharmacy. Mr. Ince, 571—Indian Materia Medica, 577—Adulteration of Butter, 577—Animals Killed with Strychnine, 577—Poisoning by Water Hemlock, Arsenic, 578—Poisoning by Ammonia, Belladonna, 579—Tampering with Poisonous Medicines, 579—Pharmacy in Durham, 580—Matthew Robinson. Mr. Ince, 580—*Review:* Elements of Chemistry, Theoretical and Practical. William Allen Miller, M.D., &c., 583—*Correspondents*, 584.

No. XII.

Legislation against Poison, 585—The Privileges of Pharmaceutical Chemists, 587.

Transactions of the Pharmaceutical Society: List of Members, &c. (*continued*), 589—Conversazione, 589—Sixteenth Anniversary of the Pharmaceutical Society, 591—Annual Report and Financial Statement, 593—Adjourned Meeting, 598—Report of the Scrutineers, 598—Council and Auditors for the Ensuing Year, 599—Phytological Club—Meeting, 600.

Provincial Transactions: Liverpool Chemists' Association—Report on the Properties of the Rivington Water. Dr. Nevins and Dr. Edwards, 600—Dry Collodion Processes, 602.

Original and Extracted Articles: Hydride of Amyle. Messrs. T. and H. Smith, 604—Report of the Results of Physical and Chemical Investigation and Applications in the Arts. B. H. Paul, Ph. D.: Extraction of Potash from Felspar and similar Minerals—Preparation of Iodide of Potassium—Ferruginous Cement—Application of Town Refuse and Sewage for Agricultural Purposes, 607—Alum in Bread. F. M. Rimmington, 611—Parchment-Paper, 612—On the Sea Saw-Dust of the Pacific. J. Denis Macdonald, 614—On the Existence of Silver in Sea-Water. Frederick Field, F.C.S., 614—Sale of Poisons Bill, 616—Pharmaceutical Society, Victoria, 619—Pepsine. Henry Parker, 621—Patents for Coating Pills. A. H. Cox, 621—Sale of Poisons, 621—Suicide, 622—Suicide from Morphia, 622—Poisoning by Mistake, 623—Carelessness in the Sale of Poisons, 623—*Books Received*, 623—*Correspondents*, 624—*Index, &c.*, 625.

THE PHARMACEUTICAL JOURNAL.

VOL. XVI.—No. I.—JULY 1st, 1856.

THE REGISTERS OF THE PHARMACEUTICAL SOCIETY.

The first Annual List of Members, Associates, and Apprentices, is contained in the present number of this Journal, and may be had separately, if desired. The importance of this periodical publication of the List or Register is not yet generally understood. The identification of the members of a society is the primary step in organization. If rank or privileges belong to membership, the claims of each member must be established and recognized, and all must comply with the conditions which their own laws impose on themselves and each other.

The List now published contains the names of all those who, up to the time of the final correction of the press, had complied with the terms of the charter and bye-laws. Some are excluded—not a large number—on account of their own negligence in responding to the official circulars issued by the Secretary. The absence of their names on the Register of the Society deprives them of the right to assume the name of Pharmaceutical Chemists, or to use any name, title, or sign implying that they are identified with the Society. Whether the circumstance arise from carelessness or from accident, it is right that the fact should be known; it is the duty of the Council to enforce the powers conferred by the Act, and to protect the Members in the enjoyment of the distinction which the Register is intended to maintain. While the Council claim the support and sanction of the Members in the performance of this duty, it is proper to remind those who exclude themselves from the privileges, that they will, in all probability, have cause to regret their lukewarmness. The Society is acquiring increasing influence, and is becoming known and recognized by the public. New Members are coming forward, and, by passing the examination, are raising the average standard of qualification, which reacts upon the character of the Society, increasing the value of membership. On the other hand, there is a tendency to expose and magnify any defects which may be found or supposed to exist in the quality of medicines, and the Society, having for many years been aiming at and promoting an improvement in this respect, it is gradually becoming more and more important to the interest of each Member to be included among the number of those who have united together for a purpose so creditable to themselves and beneficial to the public. There is, therefore, at the present time, and there will be in future to a still more marked degree, a direct connexion between the commercial interest of the Members and their status as such; and those who desire to enjoy the confidence of the public must take care to have their names included in the Annual Register of the Society.

It is scarcely necessary to advert to the advantage resulting from the association of all the members of a profession or trade, yet by many persons this is overlooked, until some circumstance occurs which brings it forcibly to the mind. A Chemist and Druggist, not many weeks ago, as we are informed, was proceeded against by the Apothecaries' Company, and fined £20. We have not received the full particulars of the case, but our informant stated that the offence was nothing more than that of recommending and selling a mixture and box of pills over the counter. If this be so, the defence was mismanaged, and a penalty inflicted for the first time to our knowledge for such an offence. If the defendant had been a Member, he would naturally have placed himself in communication with the Secretary, and would have received information and advice as to the proper mode of conducting his defence. It is probable that the case was not exactly as reported to us; the defendant may have transgressed the law. If so, the advice would not have been less useful, as proceedings of that nature are never taken without notice, and if on the first intimation he had ascertained the state of the law, he might have discontinued the illegal practice and saved the £20.

Members are continually applying for information and advice in cases of informations under the Stamp Acts, in reference to the sale of spirit of wine, and a variety of other matters in which it is the proper business of a Society to be in possession of correct information as to the state of the law, and to convey such information to Members on application.

THE BOTANICAL PRIZE.

SEVERAL correspondents have made inquiries respecting the conditions on which the Botanical Prize is offered, especially that condition which prohibits the candidate from obtaining any assistance in the arrangement and naming of the plants, except that derived from books. If this rule be strictly enforced, it has been asked whether it would not deprive the candidate of a considerable amount of colloquial instruction during the next twelve months, and whether it might not even exclude him from the privilege of attending lectures on Botany. The following remarks explain more in detail the views of Mr. Deane, who originally proposed the Prize and the conditions, which met with the approval and adoption of the Council:—

The object of the restriction is to prevent incompetent persons from competing for a prize that is intended to promote the study, and test the knowledge of Botany as a practical science.

The facilities for purchasing any number of plants correctly named, and nicely preserved, are so numerous, besides the extraneous assistance to be derived from the matured knowledge of friends and others, that it is obvious without such restriction many would compete who had no claim whatever to even the most trifling knowledge of the subject, and thus do great injustice to those who honestly carry out the conditions. It is clear, too, that if the prize or prizes were given to persons having no botanical knowledge, and not possessing the requisite qualifications, the great object for which the prize is offered would be frustrated, and discredit brought upon the Society.

It does not follow that any one who is receiving either public or private instruction, is consequently disqualified to compete; for such instruction simply refers to principles which are to enable the student to work out for himself a knowledge of individual species, their relations to each other, and their practical bearing on our professional pursuits which it is the object of this prize to promote. While a person is merely studying Botany, as with any other science, there can be no objection to his obtaining the assistance of a friend or tutor in discriminating between one substance, plant, or animal, and another. The specific differences of plants are sometimes so obscure as to perplex the most experienced; but a sincere and earnest seeker after the truth will not ask such assistance until his own wits are exhausted. This is quite a legitimate mode of procedure, but it would not be fair to have recourse to such means in competition for a prize the object of which is as above stated.

The examiners of the Society have long seen and deplored the extreme deficiency in botanical knowledge of a large majority of those who offer themselves for examination; and it is probable that at the end of this first period there will be but few successful competitors, but that from year to year, as the subject becomes more studied and better understood by our young men, the competition will be more extensive and of far higher character.

We should be sorry to offer any discouragement to Apprentices who may be disposed to compete with little hope of success, but as a stimulus to exertion, with a better prospect of success at a future time. Then they and their friends would see most forcibly the importance and superiority of practical knowledge, acquired by personal exertions in the field, over that derived from the kind and well-intentioned, but mistaken assistance in naming plants, afforded by botanical friends, with a view of assisting them in the competition for a prize.

THE LAST EDITION OF THE MEDICAL BILL FOR SESSION 1856.

Some consternation has been occasioned in Pall Mall East and Lincoln's Inn Fields by the new edition of the Medical Bill revised and corrected by a Select Committee of the House of Commons, and introduced under the auspices of the Government. It is composed of the ingredients of several previous Bills, differently combined, with a concentration of the democratic element. The Council of Medical Education is to consist of the President of the Board of Health and twelve other persons appointed by Her Majesty. Two Boards of Examiners are to be appointed in England, Scotland, and Ireland respectively, namely, the "Preliminary Board" and the "Professional Board;" the said Boards are to be selected from the three Medical Bodies and certain Universities named in each of the three sections of the United Kingdom. It is needless to state here the precise constitution of these Boards and the exact nature and extent of their functions, which are matters of detail. The important feature in the Bill consists in the fact that the candidates who have complied with the prescribed terms and conditions of the law by passing the requisite examinations are to be registered in a manner provided by the Act, and, subject to such registration, are to enjoy the privileges of legal rank and status as medical practitioners, with the power of holding offices, recovering fees and payment for advice and medicine, &c. Unregistered persons are to be excluded from these privileges, the rights of existing practitioners being reserved. The Society of Apothecaries is to be swept away, but the Colleges of Physicians and Surgeons are to continue in existence, the former body being provided with an amended Charter. To the body of general practitioners, whom it is proposed to designate as "Licentiates in Medicine and Surgery," this arrangement appears to be satisfactory. The new institution will bestow upon them a local habitation and a name, and this will acquire influence and importance from the fact that it will comprise within its precincts the entire Medical Profession, each individual being at liberty, at discretion, to raise himself to a higher honorary status by joining the College of Physicians or the College of Surgeons on the terms prescribed respectively by these Corporations. The two colleges are not satisfied with the position proposed to be assigned to them, their existence being made to depend upon the voluntary adhesion of those who, having already become possessed of all the medical and surgical rank which the law requires, may be disposed to superadd to this substantial advantage the shadow of a diploma. The President and Vice-Presidents of the College of Surgeons have transmitted a statement explaining the views of the question to the Members of the House of Commons, and they do not disguise their apprehension that if the Bill should pass in its present form, the resources of the College would be diverted into the new channel, the inducement to obtain their diploma being removed, and that their body would be left without funds, and with the encumbrance of a large National Museum and library to be maintained for the public benefit at an expense of several thousands per annum. To what extent this would actually be the case, must depend on the terms of the clauses defining the privileges of registration, for if these privileges, and the legal status be such as to satisfy a large majority of the Licentiates in Medicine and Surgery, the College diploma would become comparatively obsolete, and the examiners might "hang their harps on the willows" in Lincoln's Inn Fields.

That such is not the intention of the framers of the Bill we are fully persuaded; but we know by experience that the words of an Act of Parliament, however carefully put together, may, when subjected to the manipulations of a Select Committee, acquire a different import from that originally intended. To the College of Physicians, the Bill in its present form is objectionable for similar reasons. It does not sufficiently recognize the College as the head of its own branch of the profession, and leaves the questions at issue between that Corporation and the Universities in an indefinite, and therefore unsatisfactory state. It is still an open question whether a person can be a physician without being connected with the College of Physicians. The dispute on this point between the College and the University of London is indiscreet and impolitic. It is manifestly to the interest of the medical graduates of that and other Universities that they should be united under the banner of the College of Physicians. It is equally to the interest of the College that all graduates in medicine, holding rank as Physicians, should be connected with it either as Licentiates or Fellows. But this arrangement, equally desirable on both sides, is obstructed by a spirit of rivalry, the tendency of which is suicidal to each. Unless this difference be adjusted, we may see the anomaly of a body of graduates in the rank of Physicians, not connected in any way with the College, and dividing the influence which ought to be united for the general well-being and credit of the profession. It is equally desirable that every person holding office as a Surgeon should be a Fellow or Member of the College of Surgeons, and, as the Bill in its present form is understood to leave this question either undetermined or dependent on the voluntary decision of each individual, it is important that such amendment should be introduced as to remove the existing grounds of doubt and opposition. We understand the College of Physicians in Edinburgh is favourable to the Bill, and Dr. Andrew Wood is deputed by that College to attend in London in support of it; and that the College of Surgeons of Edinburgh being opposed to it, has delegated to Dr. Alexander Wood the charge of the opposition. The two Dr. Woods therefore sit side by side in the gallery of the House of Commons, hearing the discussion on the Bill, and representing Hope and Fear.

We have not thought it necessary to quote in detail the clauses referred to, with a full explanation of the interpretation of the words to which objection has been taken, thinking it sufficient to state in general terms the grounds of such objection. The passing of the Bill during the present Session is very improbable, as the opponents have claimed an opportunity of revision and further consideration, with a view of introducing the required amendments, and it would be impossible to arrange satisfactorily all the subjects in dispute within the required time.

The clause exempting Chemists is as follows:—

"Nothing in this Act contained, shall extend, or be construed to extend, to prejudice, or in any way to affect the lawful occupation, trade, or business of Chemists and Druggists."

Although it would appear from the terms of the above exemption that the interests of Chemists and Druggists are not affected by the Bill, this is not the fact, as the tendency of the Bill in its present crude state would be to attentuate the Colleges of Physicians and Surgeons to the verge of annihilation, and to convert the entire profession into General Practitioners. This would naturally affect the lawful occupation of the Chemist and Druggist, as his occupation would be gone. The Council of the Pharmaceutical Society will take such steps as occasion may require in case the Bill should make any progress.

PALMER'S TRIAL AND THE RESULT.

During the excitement occasioned by Palmer's trial all other topics were thrown into the shade. The Crimean inquiry as to the sacrifice—culpable or otherwise—of more than 10,000 lives from want and pestilence, appeared to be forgotten; the American dispute, with the possibilities contingent upon it, caused but little sensation: dignitaries of church and state, senators, learned professors, the votaries of fashion, and the slaves of commerce, took a respite from their ordinary pursuits, and rushed in crowds to the great centre of attraction—the Central Criminal Court. This eagerness to get a sight of the prisoner, and to devour the last shred of evidence, increased in intensity from day to day; and we believe no trial of that nature ever enlisted, in the discussion of its details, so large a number of persons of all classes and professions. Several of our correspondents have suggested that a detailed report of the trial might be suitable for this journal; but this would be quite impossible, even if the matter were appropriate, as a report* now before us occupies 326 octavo pages of small print. The illustrated and unabridged edition of the *Times* report† comprises 184 pages. We have also the illustrated Life and Career of William Palmer,‡ 138 pages, containing further particulars respecting his progress in the paths of vice, which, although not directly relating to the last crime, tend to throw some light on the character and conduct of the criminal.

There are four aspects under which this case may be reviewed—whether by the public at large, the lawyer, the medical practitioner, or the chemist. We direct our attention chiefly to the questions which have arisen between the chemical witnesses; but, in order to arrive at a correct estimate of the value of this part of the evidence, and the relative weight of the statements and opinions on each side, it is necessary to notice very briefly, and in chronological order, the general circumstances of the case.

Palmer was originally intended for a wholesale druggist, and was apprenticed to Messrs. Evans and Sons, of Liverpool, by whom he was dismissed for abstracting remittances of considerable amount from letters, which his mother refunded, and thus prevented a public exposure. He was afterwards apprenticed to Mr. Tylecote, surgeon of Heywood, where he continued his malpractices and habitual deception. In 1846, by the aid of Dr. Steggall, to whom he agreed to give a fee of fifty guineas in case of success, he passed his examination; but never paid the fee. His mother promised the doctor ten guineas extra, and gave the money to her son for that purpose, but he kept it for his own use. While a medical student he was idle and dissipated in his habits. After he obtained his diploma he married a ward in Chancery, daughter of Col. Brooks, in spite of the opposition of her guardian, Mr. Charles Dawson, druggist, of Stafford. He settled at Rugeley as a surgeon, in partnership with Mr. Thirlby, but soon found that physic was not to his taste, and took to the turf. It is needless to trace the steps of his downward course, to the desperate position of affairs which existed at the time of the tragedy; but it is important to remark that Palmer was reduced to the last extremity, the resources of fraud, forgery, and swindling being almost exhausted—ruin, disgrace, and punishment staring him in the face, which nothing could avert but the immediate possession of a considerable sum of money. At this critical moment his friend John Parsons Cook's horse *Polestar* won at the Shrewsbury races, Nov. 13. The proceeds, above £800, were in his pocket, and Palmer was with him at the Raven Hotel, on the night of the 14th of November. About 11 o'clock Mrs. Brooks (a betting lady) called to see Palmer, and on approaching his room she observed him in the lobby holding a glass in his hand up to the gas-light, as if to examine its contents. He withdrew into a room, but very soon returned with the glass in his hand and went into the room where Cook was sitting. Mr. Fisher and another gentleman called just at the time to see Cook, who, having helped them to grog, asked Palmer to take some more. Palmer said, "Not unless you will finish your glass." Cook said, "I'll soon do that," and swallowed it at a draught. He immediately exclaimed, "Good God! there's something in it which burns my throat!" Palmer drained the glass, in which a few drops were left, and said, "Nonsense, there's nothing in it." Cook suddenly left the room, calling Fisher, and a violent vomiting came on, which continued for about two hours. During this attack he gave Fisher his notes, supposed to be above £800, to take care of. Medical advice having been obtained, and composing medicine administered, he was better in the morning, and Fisher gave him back the money. On the same morning, Thursday, November 15, another friend, Mr. Herring, called on Cook, and the name of Palmer having been mentioned, he said, "How about the brandy and water?" Cook replied, "Oh, the villain did me!" Witness asked how he could, with such suspicions, go back and breakfast with Palmer. He replied in a sorrowful tone, "You don't know all." In the afternoon Cook and Palmer went to Rugeley, where Cook engaged a room at the Talbot Arms, opposite Palmer's house. He dined at Palmer's with Jeremiah Smith. In the morning the sickness returned, after having taken a cup of coffee sent him by Palmer, who also sent him some broth, which was followed by the same result. The chambermaid (Mills) tasted some of the broth which was left, and within half an hour vomiting came on, which lasted several hours. Throughout the day Palmer was continually in and out, administering a variety of things to Cook, and sickness returned on each occasion. Mr. Bamford, surgeon, of Rugeley, aged eighty-two, was called in, and administered an opiate; Palmer also called in Mr. Jones, of Lutterworth. On the Monday morning, the 19th, Cook was rather better, but still confined to his bed. Palmer went to London to settle his friend's accounts with respect to the Shrewsbury races; but it appears from the evidence that he used the money chiefly to settle some of his own debts. During his absence Cook was better, and on his return, about ten in the evening, he obtained from Newton, assistant to Mr. Salt, of Rugeley, three grains of strychnia. On the same night Cook took two pills furnished by Palmer, which were followed by alarming symptoms. He sent for Palmer, who gave him some more pills and a draught, supposed to be an opiate. He vomited and then went to sleep. In the morning, Tuesday, the 20th, Palmer bought at Mr. Hawkins' shop at Rugeley six grains of strychnia, two drs. of prussic acid, and two drs. of Battley's sedative. On the same day Mr. Jones saw the patient, and Mr. Bamford, at Palmer's request, made two pills, and wrote the direction, which Palmer took away.

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* *Verbatim Report of the Trial of William Palmer*, price 2*s*. Published by J. Allen, Warwick Lane, Paternoster Row; Cockshaw & Yates, Horse-Shoe Court.

† Published by Ward & Lock, 158, Fleet Street, price 1*s*. ‡ Ditto, price 1*s*.

About 11 P.M., Palmer administered two pills, much against the inclination of Cook, who attributed his symptoms the night before to the other pills; they occasioned vomiting, but the pills were not ejected. Mr. Palmer returned home, and Mr. Jones slept in another bed in Cook's room. Soon after midnight Cook called out that he was going to be ill again as he was the night before, and desired that Palmer might be sent for. He came immediately, bringing two pills, which he said contained ammonia. The symptoms with which Cook was afflicted were minutely described by several witnesses, and were recognized as being identical with the symptoms observed in several authenticated cases of poisoning by strychnia. The patient shrieked loud, tossed his arms as if in dread of suffocation; his limbs became stiff and convulsed, every muscle in a state of spasm, the body arched and hands clenched. He begged to be turned over, which was found to be almost impossible, on account of the rigidity of the limbs, and in a few minutes he expired. Almost immediately afterwards Palmer was detected searching the pockets of the deceased, and passing his hand under the pillows of the bed; the money disappeared, a betting-book which was previously on the dressing-table had also vanished and was never found, the prisoner was officious in giving orders for the coffin, and did not conceal his eager desire to have it speedily closed. On the 25th of Nov. he persuaded Mr. Bamford to sign the certificate of death, stating the cause to be apoplexy. On a *post-mortem* examination being decided on, he was not easy until he knew who was to perform it. He attended the examination, pushed against the surgeon who was examining the stomach and spilt part of the contents. He removed the jar containing the materials which were put up for chemical examination, and a slit was found in the bladder which was tied over the jar. He offered a bribe of £10 to the postboy if he would upset the fly in which the jar was about to be forwarded, sent presents of game and money to the coroner, tampered with the postmaster and intercepted the letter containing Dr. Taylor's report, and finally he immediately paid several debts, although it was known that up to the time of Cook's death he was without money. Such is a very brief outline of the facts of the case, to which might be added many circumstances of secondary importance, such as conversations with the prisoner in which he speculated as to the effects of strychnia and the difficulty of detection after death, endeavours on his part to escape observation while purchasing the poison, memoranda in his diary, and several rather curious coincidences which alone might be too trivial to be noticed, but which tend to confirm the other circumstantial evidence. It should also be borne in mind that two other trials for murder hung over his head, in both of which cases he was deeply involved in speculations with insurance offices. In the first case, that of his wife, who died on the 29th of Sept., 1854, he received on policies £13,000, this being less than half the amount for which he had endeavoured to effect policies; and his brother was insured shortly afterwards for £13,000, the policies being made over to the prisoner. In this latter case the offices declined to pay the claims on account of the strong grounds for belief that the transaction was a fraudulent one. It was this disappointment which interfered with Palmer's pecuniary arrangements, and drove him to the extremity above mentioned.

We now come to the important question, to what extent was the aid of chemistry required to complete the chain of evidence, and was the requisite link supplied? The known cunning and depravity of the accused, the desperate state of his affairs, his speculations with insurance offices and the sudden death of persons insured whose policies he held, the mysterious disappearance of Cook's property, and the immediate possession of money by Palmer, with other mysterious circumstances, may be comprised under the category of a very powerful motive and strong ground of suspicion. But the most essential, indeed the primary, subject of inquiry is this, did the deceased die from natural causes or from poison? The evidence of the most eminent medical witnesses, after having heard a minute description of the symptoms, appeared to settle this question without the shadow of a doubt—the final symptoms being unlike those of any natural disease, and identical with the known results of poisoning by strychnia. The previous vomiting was accounted for by the presence of antimony in the body, and a bottle of tartar emetic was found in the house of the prisoner. The purchase of poison by the prisoner, the administration of various articles of food and medicine by him to the deceased, and the symptoms which ensued, completed the chain of circumstantial evidence. But we are told by the witnesses for the defence that there is a link wanting, and that the evidence of criminal poisoning is not complete unless the poison be traced from the hand of the accused to the body of the deceased, and detected there after death by chemical analysis. If this doctrine be received as correct, a conviction could scarcely take place under any circumstances; for even if the criminal were to be so stupid as to mix and administer the poison in the presence of witnesses, there are many casualties which might interfere with its detection after a lapse of time, especially if the *post-mortem* examination were performed by inexperienced persons, in the presence of the accused, but at a time when he was not an object of suspicion. On reference to the evidence it will be seen that Palmer was almost guilty of the stupidity above mentioned, not intentionally, but by the accidental presence of a witness or witnesses at almost every stage of his proceedings. He was seen in the passage mixing something in a glass; immediately afterwards he was seen taking the glass into the room where Cook sat, and urging Cook to finish his brandy-and-water, which was followed by very severe vomiting. The purchase of strychnia and the administration of pills on two occasions, followed by symptoms of poisoning by strychnia, was also proved. But strychnia was not found in the body. This is easily explained without lessening the supposition of guilt. It is not alleged or conjectured that Cook was poisoned by strychnia alone. It would not have answered the purpose of the prisoner to kill him in the first instance. His object was to disable him, and by so doing an opportunity was afforded for obtaining the custody of his money, with a commission to go to London and settle his affairs. Pending this arrangement, Palmer was constant in his attentions, sitting up with his friend, giving him coffee, broth, medicine, &c., and everything he gave him was followed by a fresh attack of sickness. At length the patient was *hors de combat;* he handed over his money with the needful instructions, and Palmer went to London. As soon as Palmer was gone the sickness of his patient subsided, and on his return, having appropriated the money, his friend was no longer of any use to him—in short, he had become *inconvenient* and dangerous. Palmer had forged an assignment of Cook's horse for the purpose of raising money, and had appropriated his winnings to his own use. If Cook should recover he would find out the fraud and forgery which had been committed. Nothing more was to be gained by keeping him alive. Precisely at this period Palmer bought strychnia, and he gave Cook the pills which produced all the symptoms of poisoning by strychnia. The chemical analysis proved the presence of a large quantity of antimony, which fully accounted for the previous symptoms. The body of his wife was found to be saturated with antimony, and on the supposition that he systematically disabled his victims with antimony, the only circumstances which would otherwise have been involved in mystery are fully explained. The negative result of the testing for strychnia may be accounted for without breaking the chain of circumstantial evidence, which admits of no explanation other than that which judges and jury considered to be satisfactory evidence of guilt.

It is worthy of remark that the chemical witnesses for the defence give the results of their most delicate experiments performed with substances of known purity, and synthetically combined for the express purpose of analysis. In their experiments with animals their sole attention was directed to this one poison, and they had control over the materials during the whole course of the experiments. In the other case there is no reason to believe that the strychnia administered was pure. In a small shop in a country village it is more than probable that it would be otherwise. The quantity of absolute strychnia might have been extremely small, and yet just sufficient to produce death. The contents of Cook's body passed through many hands on the way to the laboratory of Dr. Taylor, and were subjected to the usual routine tests for various poisons, a portion only being available for the experiments with reference to strychnia. A negative result under these circumstances is not at all surprising, and making allowance for the advance of science on this particular subject within a few months, we cannot admit the propriety or justice of the doctrine that the isolation of the poison from the contents of the body must in all such cases be effected before a conviction can take place.

No less fallacious are the arguments in favour of the prisoner founded on his calm deliberate behaviour, self-possession, and reputed mildness of disposition, incompatible as it is supposed with the character of a murderer. Such theoretical speculations can have no weight in opposition to facts, and it is an established fact that habitual poisoners become changed in their nature; they acquire a cool methodical habit of observing the gradual effect of their diabolical art, which affords them a sort of pleasing morbid excitement. Their natural sympathies are extinguished, and they watch a victim as an angler watches a pike, whose protracted struggles add zest to the sport.

The comparison may seem questionable, but this is not the only instance in which the force of habit induces an altered feeling in regard to the sacrifice of human life. The soldier sees his fellow-men cut down by hundreds, he performs his part in the havoc, and talks of the event as a question of statistics—so many killed and wounded. The riflemen in the Crimea, in the course of their daily walks in the trenches, shot without compunction any Russians that might happen to come within range, and we have heard of a young man boasting that he had brought down 80 (40 brace) during the campaign with his own rifle. It is currently reported that Palmer brought down ten or twelve victims (some say sixteen), not with a rifle, but by weapons no less fatal, and with which he was familiar; and it is an undoubted fact that several of his relations and friends died under his care under very suspicious circumstances.

Of course the two cases admit of no parallel, except on the abstract question of the compatibility of social qualities with the habitual destruction of human life. The soldier, in the exercise of his profession, shoots or stabs only such persons as the law pronounces to be enemies and suitable for such treatment, the legality depending on the result of some diplomatic arrangements between two ambassadors, or the whim of a despot. For this service he is rewarded by a grateful country, and his amiable manners and other social virtues are unimpaired by his professional career. The habitual poisoner is a cowardly assassin; he sets the law at defiance, and is an enthusiast in his profession; yet he may pass muster in society as an amiable, benevolent man, and avert suspicion by an assumed frankness of manner, which is mistaken for innocence. This is the only mode of explaining an inconsistency in human nature, of which William Palmer affords a striking illustration.

Such being the difficulties attending investigations of this kind, complicated as they are with metaphysical speculations and scientific theories, it is the duty of all parties concerned, except those who are professionally retained as advocates, to lay aside every consideration except that of establishing the truth. To the advocate a certain latitude is allowed, and this is granted on both sides, to promote the ends of justice by the balance of arguments. In Palmer's defence, every expedient which law, physic, and even divinity could suggest was tried. In addition to the legitimate efforts of his talented counsel and the perseverance of his solicitor, whose correspondence with the Home Office after the trial displayed much tact and ability, other means were resorted to which even the partiality of an advocate could not justify. A letter purporting to be by Mr. Wakley, Coroner for Middlesex, was fabricated on behalf of the prisoner, without the knowledge of the alleged author, who, on seeing it in print, immediately exposed the fraud in a letter to the *Times*. Another letter* (of forty-eight pages, with an Appendix of thirty-two pages), addressed to Lord Campbell by the Rev. Thomas Palmer, has been extensively circulated. The author compares Lord Campbell to Judge Jeffreys when he went forth on the "bloody assize," denounces the entire conduct of the prosecution without mercy, and insinuates that judge and jury were influenced by popular prejudice and the shout, "Crucify him! crucify him!" He speaks of the prisoner as "that darling brother, the playmate of my infancy, the companion of my youthful sports, in whom my heart's blood circulates, and with whom my love is entwined." This pamphlet also has been repudiated, not, however, until after the execution had taken place. For two or three weeks it was before the public with all the weight of authenticity; but on Thursday, the 19th of June, a letter appeared in the *Times*, purporting to be written by the same reverend gentleman, and repudiating all knowledge of, or participation in, the pamphlet. The efforts made by some of the scientific witnesses for the defence to mystify and controvert the testimony on the other side, have been justly and severely commented upon in some of the medical journals; and we are glad to observe that the editor of the *Lancet* entirely coincides with the opinion expressed on this subject in our last number. Such witnesses ought to be independent, and their object should be, not to trip up each other, but to arrive at the truth. One very important medical witness for the defence, we have been informed, frankly stated before his name was called, that if placed in the witness-box his testimony would be directly against the prisoner, the evidence on the part of the prosecution being, in his judgment, conclusive. His further assistance was therefore not required.

The *Examiner* of June 21st contains the following remarks on the conduct of medical men who have come before the public either as wit-names or with theories to support Palmer's defence that Cook did not die of poi It will always be observed that if the highest medical authorities are of one opi the opposite opinion is sure to be maintained by members of the profession who a of no authority whatever. To maintain a thesis against such a man as Sir Benjam Brodie is a distinction for an obscure practitioner. It is the cheapest and best a vertisement. The first surgeon of our time is of one opinion, and Gallipot and Bo are of another—and Gallipot and Bolus must be men of mark, or they would n presume to take the field against Sir B. Brodie."

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* *A Letter to Lord Chief Justice Campbell, containing Remarks on the Conduct of the Prosecution and the Judges, with Strictures on the Charge delivered to the Jury, illustrative of its dangerous tendencies to the long-enjoyed rights and privileges of Englishmen.* By the Rev. Thomas Palmer, brother to the prisoner, William Palmer. With an Appendix of Documents. London: T. Taylor, 38A, New Bridge Street, Blackfriars. Price 1*s*.

Without endorsing this sweeping charge we quote the passage to show wh a false position professional men place themselves in by laying aside the i partiality of a witness, and becoming advocates in such a case. If Palm had been an obscure individual—an ordinary hanging murderer, he would ha been tried, and hanged, and forgotten, with the usual despatch; but, havi been a medical man, skilful in poisons, a notorious Betting and speculator lives, an act of Parliament was passed to ensure him a fair trial in London, a unprecedented exertions were used to procure his acquittal. Besides the ar of legal advisers, relatives, and turf companions, he was heavily backed by variety of persons who had bets depending on the result of the trial—m company for professional witnesses! Palmer's denial of the offence was quibble. He repeatedly said he never shed blood, and had not poisoned Co with strychnia, leaving the public to guess what poison or combination poisons was the cause of death.

The controversy respecting the detection of strychnia has not yet terminate and although the chemical profession has gained no honour or credit by the pu disputes which have arisen among the witnesses, yet we may hope that chemi science has made some advance, and that the mode of detecting strychnia will better and more generally understood than it was six months ago. The follo ing is quoted from a letter of Dr. Letheby in the *Times* of June 13th:—

"So many inconsistencies and inaccuracies have lately appeared in public papers respecting the discovery of strychnia in the dead body, tha think it right to say that there is not any material with which it can be mixed the animal body, or process of putrefaction that can in any way interfere with extraction and recognition. Tartar emetic, common salt, a little nitre, bile, su and a score of other things, will destroy its reaction when the tests are performed those who are not acquainted with the principles of chemistry; but in the hands the adept such difficulties are instantly overcome.

"As to the so-called fallacies of the colour tests for strychnia, these also fallacies only when the tests are improperly performed; but to do away with possible sources of doubt and fallacy from the action of external reagents, I m state that the putting of a little strychnia with sulphuric acid, on a piece platinum foil, then connecting the foil with the positive pole of a single cell Grove's or Smee's battery and touching the acid with the negative pole, terminat in a piece of platinum wire, the violet colour so characteristic of strychnia instantly produced.

"This mode of experimenting was suggested by the fact that the colour tests strychnia are due to the action of nascent oxygen; and so delicate is the galva test that it will discover the presence of the 10,000th of a grain of strychnia; a besides this, its very nature is such as to do away with all possible sources fallacy."

In answer to those chemists who affirm that strychnia could under any circu stances be detected in the body, however small the quantity administered, M Ancell makes the following remarks in a letter published in the *Times* of above date:—

"In the case of Cook, who is to affirm that, while on the one hand, the poison w producing its deadly effects on the nervous system, on the other it was not be separated into one or more of the secretions? On what ground can it be assum that at the moment of death one particle remained in the blood, or any orga structure, to tell its tale?

"Two grains of strychnine, if pure, are sufficient to produce its deadly effects. There is believed to be about twenty-five pounds of blood in the adult human body: and the proportion in which strychnine continues to be detectible, is variously stated by Mr. Herapath and other witnesses as 1-20,000th to 1-50,000th part of the substance operated on. If the whole of the assumed quantity of strychnine were absorbed at once, and were present, equally diffused in the blood, at one instant, it would constitute, on these data, only 1-96,000th part of that fluid. But when foreign agents, as strychnine, are thus received into the blood by absorption, the process is gradual; and as they reach the heart, experience has shown they become irregularly diffused. So that if a part of the body only be examined, that part may contain more or less or none of the poison. The separation of the poison with the secretions is almost as rapid as the absorption. How rash, then, must the assertion be, that strychnine must be necessarily detectible in any particular organ, or in the blood of any organ, or in that obtained from any part of the body; or that it must certainly exist in the body after death.

"Professor Taylor has been assailed on the ground that the hypothesis of strychnine being decomposed in the body is an invention of his own. Nothing can be more unjust. The hypothesis, apart from its application to poisoning by strychnine, has been maintained by chemists and physiologists of the highest character for many years. It is a very general, although not an exclusive doctrine, that when foreign agents, such as strychnine, produce their effects on the living body, the decomposition of a portion of the agent results. Liebig holds that the vegetable alkaloids (to which class of chemical substances strychnine belongs), when received into the blood, are decomposed by the action of the oxygen of the atmosphere. Although I think it is to be regretted that Professor Taylor relied exclusively on this explanation of the fact, that strychnine might not be detectible after death by its own agency, there is no ground for the accusation that this gentleman invented the hypothesis to serve a purpose."

Mr. Ancell's letter has been commented upon by Mr. Rodgers, who, in a letter to the *Times* of June 13th, says—"I cannot conceive an opinion more dangerous to the public safety than that a fatal dose of poison can be so nicely adjusted as to escape discovery after death." We think the opposite conclusion would be much more dangerous—namely, that the non-discovery of a poison may be taken as evidence that it was not administered. In the first case, the possibility of a negative result affords to the criminal no information as to the mode by which the dose may be so "nicely adjusted;" in the latter case, the poisoner need only select a poison which does not admit of detection by chemical analysis, and, if all other evidence is to be discarded, his acquittal would be certain. Mr. Rodgers gives the following process as the result of experiments by himself and Mr. Girdwood on the detection of strychnia:—

"The tissues of the body are rubbed with distilled water in a mortar to a pulp and then digested, after the addition of a little hydrochloric acid, in an evaporating basin; then strained, and evaporated to dryness over a water bath; digest the residue in spirit, filter, and again evaporate to dryness; treat with distilled water, acidulated with a few drops of hydrochloric acid, and filter; add excess of ammonia, and agitate in a tube with chloroform; the strychnine in an impure condition is entirely separated with the chloroform. This chloroform solution is to be carefully separated by a pipette, and poured into a small dish, and evaporated to dryness; the residue is moistened with concentrated sulphuric acid, and heated over a water-bath for half an hour; water is then added, and excess of ammonia—again agitated with chloroform, and the strychnine will be again separated by the chloroform, now in a state of sufficient purity for testing, which can be done by evaporating a few drops on a piece of white porcelain, adding a drop of strong sulphuric acid, a minute crystal of bichromate of potash being added in the usual way; or the elegant mode proposed by Dr. Letheby can be adopted."

Mr. Copney's paper, in another part of this number, contains further information on the subject, which will be interesting to our readers, and will serve as an answer to several correspondents. We shall have occasion to revert to the subject of strychnia when reporting the case of the Doves, which will soon come on for trial.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *June 4th,*

being the First Meeting after the Anniversary, the following officers of the Society were elected:—

Mr. Jacob Bell	*President.*
Mr. William Lionel Bird	*Vice-President.*
Mr. Daniel Bell Hanbury	*Treasurer.*

Mr. George W. Smith was also re-appointed *Secretary and Registrar.*

PHARMACEUTICAL MEETING,

Wednesday, June 4th, 1856,

MR. JACOB BELL, PRESIDENT, IN THE CHAIR.

Donations to the Library:—

Journal of the Society of Arts, by the Society.
Journal of the Photographic Society, from the Society.
Literary Gazette, from the Publishers.
Annals of Pharmacy, vol. iii., from Mr. Dickinson.
Lehmann's *Physiological Chemistry* (in German), from Mrs. Pereira.

The Chairman said it was quite contrary to his expectation, and very much against his judgment, that he found himself elected to the office of President for the ensuing year. He had always resisted it, and declined to serve, believing it to be for the interest of the Society that the responsibility should be divided; and he only regretted that there were not many more offices of trust, which would increase the number of working members by obliging them to attend. His election would deprive him of the assistance of a President, without enabling him to do more than he had been in the habit of doing in the service of the Society. The other Members of the Council having been unanimous, he had been obliged to defer to their judgment, although contrary to his own. The cessation of hostilities in the Society had brightened its prospects, and would facilitate the proceedings; and as the star of Peace had shone on the outside of the building, he hoped harmony would continue to reign within. So long as they were united among themselves, any attacks or hostility from without would only tend to bind them closer together, and thus increase their strength; but experience should teach them to beware of internal dissensions, and the evils of a house divided against itself. The Members of the Society should bear in mind that they have upon them a duty and responsibility, the importance of which is constantly made obvious by passing events. In Palmer's trial, and other recent cases of poisoning, who were the parties called in to assist in the chemical investigations? *Not* pharmaceutical chemists, but medical practitioners—and why? Because the only class of persons hitherto competent to undertake such duties in this country were members of the medical profession, of whom only a very limited number possessed the requisite practical experience. In France and Germany the pharmaceutical chemists are regularly consulted in such cases, and so it would be in England if the improved education contemplated by the Society were brought to maturity. This would be a work of years. The founders of the Society, those who had borne the labour of establishing it and introducing the improved system, could not acquire that proficiency in science which they desired to see in their successors. They had passed through their education, and their habits of business were formed long ago. They might learn something every day, and, to a certain extent, keep pace with the times; but could not expect to acquire a reputation as analytical chemists, or to be appealed to as authorities in toxicology. But they might reasonably hope to see the young men of the present time come forward as their successors, taking a higher scientific position, and including the chemistry of poisons among the regular duties of the pharmaceutical chemist. Professor Christison, in the February number of the *Edinburgh Medical Journal*, fully coincides with this view of the subject. In reference to the case of Mrs. Wooler, in which he says the medical witnesses were perplexed by the rather ambiguous results of their analysis, he proceeds as follows:—

> "No one acquainted with the condition of medicine in its several branches throughout the British Islands can entertain any doubt that country districts, and towns generally, even towns much larger than Darlington, do not present scientific resources at hand to meet the exigencies of such a case as that of Mrs. Wooler, and others which will occur to everybody. I do not think that the present organization of the medical profession can supply the remedy. The chemical education of medical practitioners has been improved of late, and that of pharmaceutic chemists is undergoing improvement. But the qualifications of both are still much below what are needed for carrying on an inquiry of great nicety with that certainty, facility, and despatch which are necessary for eliciting the truth with due speed. The defect is a serious one. For the public are now fully alive to the existence of poisons and modes of poisoning, previously known only to men of science, and demanding refined analysis for their detection. Hitherto, for the purposes of detection, science has kept far ahead of practice. It has done so most remarkably in the very kind of poisoning with which we are presently concerned. For slow poisoning with arsenic, the most refined to carry out, is now probably also the most certain of detection. But the requisite science is confined to a few, and therefore the country generally may lie ere long at the mercy of any one who may prostitute his professional knowledge, or may expressly acquire that knowledge, for the perpetration of the most fearful of crimes.
>
> "A remedy can scarcely be supplied by the Boards which regulate the education of medical practitioners. Some undoubtedly still neglect Chemistry too much in their requisitions. But, can any of them reasonably exact of mere medical practitioners at large, that scientific knowledge and practical skill in chemistry which are here indicated to be wanting? Not, at all events, until the Legislature and the public consent to hold out the requisite encouragement, by enlarging their privileges and raising their position. The purely medical studies of the practitioner now require too elaborate an education to allow of this additional exaction being imposed. There is, indeed, no probable remedy, so far as I can see, except the division of labour; by which chemico-legal duties, separated from the medico-legal, may be put into the hands of the pharmaceutic chemist, to whose province such duties will be appropriately attached, so soon as his education and his position in society in this country shall be duly elevated. This is the rule abroad, in France and Germany, in Germany particularly, where there is scarce a little town without a pharmaceutic chemist, who would have settled the Darlington case in a short time."

The Chairman also wished to notice another subject, which had reference to the character of the body of pharmaceutical chemists. Certain interested parties had issued several pamphlets, purporting to contain the substance of the evidence before the Parliamentary Committee on the adulteration of food and drugs. A number of instances of adulteration were quoted, some of which had been exposed and discussed at meetings of the Pharmaceutical Society; some had been published by various persons during the last twenty or thirty years; and others existed only in the imaginations of the promulgators. These cases had been collected together, and were now published as a "fair specimen" of the mode in which business is conducted by chemists throughout the country. The pamphlets were issued for the purpose of bolstering up a speculation in which the compilers have embarked for the sale of the articles enumerated in their list. So transparent an artifice, based upon garbled statements and misrepresentation, would be quite unworthy of notice, except that it may serve to remind the members of the Society of the importance of a scrupulous attention to the quality of their drugs and preparations. The subject having been brought under public notice by the parliamentary inquiry, it was well to be aware that there are parties on the look-out for any opportunity that might occur of puffing themselves into notoriety, by parading and exaggerating the delinquencies of others.

The interest of the Members demanded that they should individually endeavour to improve and keep up the quality of their stock; and although absolute purity (in the sense in which the term is used by chemists) is not practically attainable, yet all should aim at the nearest approach to such purity, and to this end the main efforts of the Society had been directed from the commencement. Among other means of promoting this object, the Pharmaceutical Meetings, where adulterations and the means of detection, as well as improvements in the preparations of the Pharmacopœia were discussed, claimed the general support of the members; and the Chairman expressed a hope that a larger number would attend, and give the Society the benefit of their experience in such matters.

Some remarks were communicated

ON THE DISTILLED WATERS OF THE PHARMACOPŒIAS.

BY MR. HASELDEN.

The author stated that what he had to communicate was submitted to the meeting, not as comprising anything new, but in reply to the request which had been made that those practically engaged in the preparation of distilled waters would give the results of their experience on this subject. He adverted, first, to simple distilled water, which he thought ought to be more generally used in pharmaceutical operations than it was at present. It would, he said, be a desirable point gained if the colleges were to direct in future Pharmacopœias, that whenever water was ordered, either in preparations or prescriptions, none other than distilled water should be used. This would obviate some difficulties which occasionally arise on account of differences in the appearance of medicines made from the same prescription, but dispensed at different houses. In order to keep up a cheap and sufficiently abundant supply of distilled water, an arrangement should be adopted, wherever practicable, for having it condensed by a condenser, used for no other purpose, from a source of steam constantly in operation.

"I now turn to the other waters, which seem hitherto to have enjoyed the larger share of attention, and these for the sake of convenience, and not to occupy too much time, by considering each separately, I have arranged in three divisions, as my experience has led me to consider most appropriate. In the first division I have placed dill-seed, caraway, fennel, cinnamon, and pimento waters, in the preparation of which I am of opinion that the process of distillation is preferable to any other, as they are not likely to be contaminated with much mucilaginous matter, which might render them particularly liable to become sour; of these five, the fennel and pimento give the most trouble, the pimento continually depositing, for which I have found no better remedy than filtration; the fennel, if kept long, and there is not a large demand for it, becoming ropy, for which, I believe a little spirit to be the best preventive.

"The excess of oil which generally passes over in distilling these waters, where the material acted upon is good, should be shaken well up with the water and transferred to the stock vessel, allowing it afterwards to separate, and when required, running it semi-opaque as it may be into the ordinary bottles in daily use; the oil being left in the stock vessel assists in preserving the water, and keeps it the full strength to the last. Occasionally remove the surplus oil when a fresh supply of water is put in, and the oil so collected will be found pure and fit for every purpose for which it may be required.

"In the second division I place peppermint, spearmint, and pennyroyal waters, and in preparing these I consider trituration with magnesia or fine sand, always supposing that genuine oil is used, answers extremely well; but, as with the former, they should be kept in quantity, made some days before required for use, allowed to settle, and drawn off as wanted without being filtered. I can see no objection to the employment of magnesia, as ordered in the Pharmacopœia of 1836; the impression held by some that it absorbs the oil, and reduces the strength of the water, appears to me an erroneous one. Volatile oils are not given to saponification.

"In the third division I have rose and elder flower waters, and with these I return to the plan of distillation, preferring the pickled to the fresh flowers, as I think the water from them is more permanent in odour and keeps better, being less mucilaginous and less apt to turn sour; these should also be kept in bulk, allowing the unsuspended attar, or volatile oil, to remain, and filtering as required. With the pickled flowers there is also the advantage of being able to draw any quantity as most convenient, according to consumption. The addition of spirit to rose and elder-flower water is, I think, of no advantage, but rather the reverse, as these waters are principally employed, pharmaceutically, in collyriums, where the presence of spirit may be objectionable. Otto of roses should not be used for making rose-water unless it be intended merely as a perfume.*

"Stone, or non-porous earthen jars, I believe preferable to glass for keeping the waters in; they should be furnished with taps placed about two inches from the bottom, with beaks sufficiently small to fit into the ordinary shop bottle, which may thus be easily filled. The heavier oil of cinnamon will sink to the bottom, whilst the lighter ones will float on the surface. The tap placed as directed will steer clear of both, and the water may be drawn as needed, without trouble or inconvenience.

"Before quitting the subject, I will venture to add a word or two upon the operation of pickling. The proportion of salt which answers well is three pounds to one of flowers; they should be thoroughly mixed, and pressed rather compactly into the vessel in which they are to be kept; and for this purpose an olive oil jar, well cleaned, answers remarkably well."

18, *Conduit Street.*

The CHAIRMAN thought it an important question whether the roses used for making rose-water yielded the best result in the pickled or fresh state. He had been accustomed to consider the fresh petals, when carefully picked, better than those which had been pickled; but the opinion of several practical men seemed to be otherwise.

Mr. GIBBS considered both rose and elder-flower water prepared from the pickled flowers to be equal, if not superior, to that made from fresh flowers. In submitting the fresh flowers to distillation, they were very apt to rise up into the still-head, and more organic matter was carried over than was the case when pickled flowers were used, which caused the water to become ropy and sour. Then, the fresh flowers could only be obtained at one season of the year, which was a disadvantage, as it rendered it necessary to prepare enough of the water at once to last for the whole year, while the pickled flowers could be used at any period. He had adopted a method, which he found very advantageous, for preparing the waters comprised in Mr. Haselden's first division, including pimento, dill, and cinnamon water. This consisted in mixing the essential oils with purified sawdust, putting the mixture into a suitable vessel, and passing steam through the vessel, and afterwards into the condenser. Mr. Coffey had fitted up an apparatus of this sort for him which yielded very good products, some of which he submitted to the meeting.

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* If the following description which has been given of the method of obtaining otto, is, as no doubt it is, correct, there can be little or no genuine otto imported into this country, looking even at the largest price we pay for it:—"The Rose gardens at Ghazepore are fields in which small rose-bushes are planted in rows. In the morning they are red with blossoms, which are gathered before mid-day, and their leaves distilled in clay stills, with twice their weight of water. The water which comes over is placed in open vessels, covered with a moist muslin cloth to keep out the dust and flies, and exposed all night to the cool air or to artificial cold, as we set out milk to throw up its cream. In the morning a thin film of oil has collected on the surface, which is swept off with a feather and carefully transferred to a small vial. This is repeated night after night till nearly the whole of the oil is collected from the water. It is said that twenty thousand roses are required to yield a rupee weight (rather less than 170 grains) of pure oil, which sells for £10 sterling."—*Hooker.*

Mr. D. **Hanbury** thought the quantity of rose-leaves ordered in the Pharmacopœia unnecessarily large.

The **Chairman** suggested that in adopting Mr. Gibbs's method of making cinnamon water, it would be better to operate upon the bruised cinnamon bark, rather than a mixture of sawdust and oil, as the oil of cinnamon of commerce generally contained a good deal of cinnamic acid, resulting from exposure to the air, and consequent oxidation.

Mr. H. **Deane** thought the evidence of men who had had much experience in making distilled waters, was in favour of the use of pickled in preference to fresh flowers. He knew that this was the opinion of the late Mr. Pigeon, who was for many years largely engaged in the preparation of rose-water, and other distilled waters. With reference to simple distilled water, which was now frequently required by photographers, he had been surprised at the amount of impurity acquired from the atmosphere when it was kept in a laboratory or warehouse where other chemicals were stored. He had recently had some distilled water returned which gave a precipitate with nitrate of silver, which precipitate, on examination, was found to be carbonate; yet he knew the water had originally been pure. He mentioned this to show the importance, under such circumstances, of keeping distilled water in close vessels.

Mr. **Attfield** confirmed the statement just made. In the laboratory in which he was engaged, the distilled water was found to precipitate nitrate of silver, and it was found that this arose from the absorption of hydrochloric acid gas, which had occurred in consequence of a bottle of the acid having been placed near to the store of distilled water.

Mr. **Hanbury** remarked that the description, quoted by Mr. Haselden, of the method of obtaining otto of roses at Ghazepore, did not refer to the otto of roses of English commerce which came from Turkey, and of the mode of preparing which, he believed, very little was known. He had no doubt, however, that commercial otto of roses was not genuine. In fact, he had only seen two small specimens of pure otto, one of which was at the Paris Exhibition, and the other had been presented to the Museum of the Pharmaceutical Society by Mr. Whipple, who had collected it in the distillation of rose-water.

Mr. **Morson** agreed with Mr. Hanbury that at the present time very little was known of the history of otto of roses. There was every reason to believe that what came to this country under that name, was a mixed article, and probably this was even the case with the few small specimens which were occasionally offered, at a very high price, as genuine otto of roses.

The **Chairman** observed, that at the Paris Exhibition the specimen of pure otto of roses, to which Mr. Hanbury had referred, was placed by the side of oil of geranium which was said to be used for mixing with the otto to make commercial otto of roses.

RHATANY ROOT.

Mr. Daniel Hanbury, in drawing attention to some specimens of Rhatany Root upon the table, remarked that it was well known to most druggists that Rhatany Root, such as usually found in commerce, had, within the last few years, become very scarce. The drug that had of late been imported was of two kinds—one, a root chiefly in thick, woody pieces, which appears to be none other than an inferior quality of the old sort of Rhatany, and the other, a highly astringent root imported from New Granada, and evidently the produce of a distinct species. The latter drug was described some years ago*, by Dr. W. Mettenheimer, of Giessen, as *Spurious Rhatany*, and more recently, and with much more detail, by Dr. Schuchardt of Dresden. Dr. S. calls the new drug *Savanilla Rhatany*, a name derived from the port in New Granada, where it has been shipped for Europe. Dr. S. considers the Savanilla Rhatany to be the produce of a species of *Krameria*, perhaps described, and to be an efficient substitute for the now scarce Rhatany of Peru.

OXIDE OF ZINC.

Mr. Morson made some observations on the oxide of zinc which had been exhibited at a previous meeting. He had heard an objection raised to the use of that oxide, on account of its not being soluble in ammonia, like the ordinary oxide of zinc of commerce. This appeared to arise from the fact that the impure oxide of zinc of commerce was a hydrate which was readily soluble, while the oxide made by combustion, being anhydrous, was not so. This, however, was not a just ground of objection to the oxide of zinc made by combustion, which he had no hesitation in saying was more suitable for use in medicine than any other.

Mr. **Redwood** observed that the oxide of zinc made by combustion by Mr. Hubbuck's process, corresponded with that ordered in the Pharmacopœia, in being anhydrous. They were both equally insoluble in ammonia, and differed in this respect from the impure oxide of commerce, which, being hydrated, was soluble in ammonia.

The **Chairman** said, as that was the last meeting for the season, he wished to remind the Members that a supply of papers would be required in October when they would meet again, and he hoped these would be provided during the recess.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, 22*nd May*, 1856.

THE PRESIDENT, MR. ABRAHAM, IN THE CHAIR.

Mr. J. M. **Studholme** was elected a Member of the Society.

A Paper, of which the following is an abstract, was read—

ON THE PRESERVATION OF FRESH MEAT.

BY GEORGE HAMILTON, ESQ., F.C.S., F.R.A.S.

In November, 1852, Mr. Hamilton was consulted by two mercantile gentlemen of Liverpool on the practicability of bringing cargoes of beef in a fresh state from South America into this country, and, as the nature of his answer was likely to affect a commercial speculation, he thought it necessary to make a series of experiments; but before proceeding with these experiments, he was desired to express his opinion in writing, and show the ground on which a hope might be founded of ultimate success. After referring to the changes to which beef is liable, either from combination with oxygen supplied by the atmosphere in presence of watery vapour, or from a change in the internal arrangement of its atoms, which proceeds most rapidly with a scanty supply of air and a slightly elevated temperature, he said, "It is possible to prevent both oxidation (eremacaucis) and putrefaction by various means; but the condition that the meat shall be in all respects like fresh meat in colour, consistence, and taste, and be fit for human food, surrounds the problem with difficulties. If the meat were placed in an air-tight vessel connected with an air-pump, the air could not be completely exhausted by working the pump, however long, and as putrefaction is hastened by diminution of pressure, an imperfect vacuum would be worse than useless. But when the exhaustion is as complete as the power of the pump will allow, if a gas were introduced which would combine with the oxygen remaining in the pores of the meat as well as with that in the containing vessel, the whole of the oxygen could be withdrawn. Binoxide of nitrogen would effect this object perfectly. The vacuum thus left might be filled up with some other non-oxidising gas, such as carbonic acid, carbonic oxide, nitrogen, or hydrogen; but as I am entirely ignorant of the effect which these gases would produce on the colour, consistence, and taste of the meat, I know of no way of answering the question satisfactorily without entering on a long and tedious series of experiments."

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* *Pharm. Journ.*, xi. p. 420.

The following are a few of the experiments made:—

1. Fresh beef was placed in a box with chloride of lime, the beef resting on a perforated board, screwed on the lid.

Result.—After twenty-one days opened the box, colour good, some mouldy spots on the surface, disagreeable musty odour, decomposition had commenced.

2. Placed a piece of beef in a bottle of chlorine, and kept it fourteen days carefully stoppered.

Result.—The beef had greatly diminished in size, was tough, had a dark livid colour, and strong odour of chlorine. After free exposure to the air for twenty days it became dry and hard—did not putrefy.

3. Confined a piece of beef in a stoppered bottle with ammonia.

Result.—It gradually darkened in colour and softened. At the end of fourteen days was very soft, smelled strongly of ammonia, and soon dried up to a hard shining mass, without putrefying.

4. Placed a piece of beef in a stoppered bottle, supporting the beef on a piece of wood thrust through it, and filled the bottle with binoxide of nitrogen.

Result.—At the end of twenty-one days the colour not changed—faint odour of nitrous acid, the beef appearing perfectly fresh and good.

5. Placed a piece of beef weighing six pounds in a large glass jar, supporting the beef on the point of an inverted glass funnel, the broad end of which rested on a deep plate, on which the glass jar was inverted. Filled the jar with binoxide of nitrogen.

Result.—The exuding juice dropped into the plate, forming a scum on the surface of the water, and a white fatty looking substance, which sank. At the end of twenty-eight days the water had an excessively offensive odour. Took out the beef at the pneumatic trough without removing the gas. Found it perfectly fresh. Replaced it in the jar and added fresh water. During five months the water gradually rose in the jar. It was then necessary to add more binoxide of nitrogen. At the end of 150 days the meat was taken out. In colour and consistence it was almost undistinguishable from fresh meat. The colour was slightly paler, owing, no doubt, to the action of the water in which it had been frequently immersed. It had a faint odour of nitrous acid. It was cooked by boiling, the water being changed three times during the process, and the boiling continued three-and-a-half hours. In colour and consistence not distinguishable from fresh meat cooked in the same manner. Taste tender and good—fat particularly fine. A piece of the uncooked meat left freely exposed to the air dried up in twelve months to a hard brown shining mass, contracting very much in size. A few mouldy spots appeared on the surface, but it did not putrefy. Portions of lung, brain, blood, and hide were also kept in an atmosphere of binoxide of nitrogen, with the same results; and a long series of experiments was made to ascertain the effect of nitrogen, carbonic oxide, carbonic acid, and hydrogen, and mixtures of these gases with binoxide of nitrogen, but of all these gases binoxide of nitrogen alone preserves meat unchanged, though its action would not be impaired by a portion of nitrogen or carbonic acid being mixed with it. The conclusions, however, drawn from all these experiments, will be best seen by the following summary:—

1. The fumes of chloride of lime will not prevent the putrefaction of beef.

2. Chlorine gas prevents putrefaction, but it cannot be employed to preserve flesh meat intended for human food.

3. Ammonia cannot be employed to preserve meat. It prevents putrefaction, but imparts to the meat a repulsive appearance, consistence, and odour.

4. Binoxide of nitrogen preserves beef from putrefaction without changing its colour or consistence. When the fibre of the meat is cut, the gas is absorbed rapidly into the pores, and the juice exudes. The quantity of juice lost is great when the volume of the gas bears a large proportion to the volume of the beef, and the loss is augmented by exposure to light. The loss is least when these conditions are reversed, but when the volume of beef bears a very large proportion to the volume of the gas, the beef will not be preserved at all.

5. When beef is kept in binoxide of nitrogen a sufficient length of time to coagulate the albumen, it does not afterwards putrefy when exposed to the air.

6. Nitrogen, protoxide of nitrogen, carbonic acid, carbonic oxide, and hydrogen, cannot be employed to preserve meat from putrefaction. No conclusions could be drawn from the experiments with mixed gases, since the preparations were not kept a sufficient length of time, but the results seemed to indicate that the action of binoxide of nitrogen would not be impaired by a certain proportion of nitrogen or carbonic acid.

Although the experiments were interesting in a scientific point of view, and were attended with some degree of success, yet Mr. Hamilton did not feel justified in recommending a trial of the process on a large scale. The high price of the materials required for making the gas, the necessity of sending such materials to the country from which the meat was to be imported, the impossibility of procuring in those countries persons sufficiently skilful to manipulate with gases, were considerations not to be overlooked. These experiments were made the subject of a paper read at the meeting of the British Association at Liverpool in 1854, but a very imperfect notice of them appeared in the Report of the Association and some of the scientific periodicals. The Abbé Moigno was present when the paper was read, and requested and obtained a copy of it for insertion in his *Cosmos*. No notice of it, however, appeared, though several applications were made to him to insert the whole or an abstract, but in June, 1855, Mr. Hamilton received a letter, of which the following is a translation.

"My dear Mr. Hamilton,—I lately received a note from Mr. Archer, reminding me of the promise which I made to you to insert the interesting series of experiments which you made on the preservation of fresh meat. I wished in fact to make a translation to-day, and was engaged with it, when, to my great annoyance, I discovered that the manuscript, such as I found it on my return from London, was incomplete. * * * Be so good as to fill up that void by one of the earliest posts, and you may be sure that you will find in the *Cosmos* which follows the arrival of your letter, my translation complete. It will have great interest at present, because a M. Lamy, of Clermont-Ferrant, is exhibiting very curious (?) products animal and vegetable, preserved, I think, by carbonic acid or carbonic oxide. I shall be happy to make known your priority. "L'ABBÉ F. MOIGNO.

"16*th June*, 1855."

Mr. Hamilton replied to this letter that he would feel obliged by the Abbé inserting any portion of what remained, or any notice of it; but no notice appeared in the *Cosmos*. On the 13th of July, however, an article appeared headed "The Wonder of Wonders at the Palace of Industry. Preserved Meats by M. Lamy," in which the writer, in the most glowing terms, spoke of a collection of products, so unexpected, wonderful, and extraordinary, that in order to believe in their existence it was necessary to see them with one's own eyes, and touch them with one's own hands. M. Lamy, it was stated, had discovered the secret of preserving in their natural state, without drying, without compression, without hermetically sealing, in open space, all the most fermentescible and decomposable substances of nature—meat, game, roots, fruits, butter, milk, even the barm of beer; and to effect this, as the decomposition and putrefaction of animal and vegetable substances commence by the fermentation of an albuminous principle, it is necessary to modify it by precipitation or coagulation by means of a gas properly selected. For the fruits, the article says, "M. Lamy has recourse to certain salts analogous to protosulphate of iron or protochloride of copper."

We have no right to expect a description of a patented process, but we must demur to the explanation offered by the editor of the *Cosmos*, as inconsistent with known chemical facts. Neither carbonic acid, nor carbonic oxide will prevent the putrefaction of meat, nor will the presence of protosulphate of iron or any other analogous salt, in the way described, prevent the decomposition of fruit.

In concluding this paper, Mr. Hamilton said, "I wish it to be distinctly understood, that I bring this subject forward at present in compliance with the request of several friends, and not with a view of setting up a claim to priority. If M. Lamy has done all that is described in the *Cosmos*, he has indeed accomplished a 'wonder of wonders,' which casts into the shade my comparatively imperfect experiments. Under these circumstances, a claim on my part, to priority, grounded on the mere fact of publishing first, would be simply ridiculous. The expression, 'I shall be happy to make known your priority,' in the Abbé's letter, is his own voluntary offer, for which I am in no way responsible. It would afford me great pleasure to see the preparations of M. Lamy, and to congratulate him personally on the brilliant results of his experiments. It is gratifying to me to know that I have been engaged in the same field of research, guided by the same kind of reasoning; and, although apparently with greatly inferior success, using probably the same means to accomplish the same ends. It would have been an additional gratification if the editor of the *Cosmos*, who had my papers so long in his possession before writing his well-merited eulogium on M. Lamy's labours, had, even incidentally, made allusion to mine."

A vote of thanks was passed to Mr. Hamilton for his important communication, which was illustrated by specimens of meat which had been preserved some months in binoxide of nitrogen, and which not only looked as fresh as if only just killed, but when cooked, as some of the specimens were, could not be distinguished from fresh meat.

Thursday, *4th June*, 1856.

THE PRESIDENT, MR. ABRAHAM, IN THE CHAIR.

Mr. A. Stewart, Birkenhead, was elected a Member, and Mr. Brown an Associate of the Society.

The SECRETARY announced Donations to the Museum from G. C. Huson, Esq.; J. Dutton, Esq.; C. Jones, Esq.; Messrs. R. Sumner and Co.; and Messrs. J. H. and S. Johnson.

Mr. MERCER delivered a lecture on "Potassium and its Compounds."

The thanks of the meeting were voted to Mr. Mercer for his lecture, and to the donors to the Museum.

Thursday, 19*th June*.

THE PRESIDENT, MR. ABRAHAM, IN THE CHAIR.

Mr. Thomas Kirk, Mr. J. S. Butler, and Mr. Foulkes, were elected Members of the Society.

The Secretary announced donations to the Library and Museum from Messrs. T. C. Archer, J. H. & S. Johnson, T. Edwards, J. H. Johnson, J. Houghton, W. Shortiss, and N. Mercer, and afterwards read the following letter from George Hamilton, Esq.

"*Blackburn House*, 19*th June*, 1856.

"Dear Sir,—I regret that I shall not be able to attend the meeting of the Chemists' Association this evening. I would gladly have had the pleasure of hearing Dr. Edwards lecture on strychnia, and of communicating the result of some experiments of my own on the same substance.

"With respect to the experiment which I named to you on Tuesday last, I would rather not bring it before the Meeting in a formal manner, until I am perfectly certain of the conclusion to which the experiments seem to point.

"The idea occurred to me that the highly complex molecule of strychnia might be decomposed by the action of a ferment. I tried common barm, and it appears to be successful. One could wish that a glass of beer with a spoonful of common barm would prove an efficient antidote to the poison.

"Sulphuretted hydrogen gas passed for an hour through a solution of strychnia, did not affect the reaction with bichromate of potash and sulphuric acid.

"I am, yours very respectfully,

"GEORGE HAMILTON.

"NATHAN MERCER, ESQ.,
"*Secretary Chemists' Association.*"

After a little discussion on Mr. Hamilton's important communication

J. B. EDWARDS, Ph.D. (Lecturer on Medical Jurisprudence at the Liverpool School of Medicine), then delivered the lecture for the evening on Strychnia.

He commenced by describing the origin, composition, and mode of extraction of strychnia, and illustrated by experiments the various modes by which it is detected.

He then referred to the conflicting chemical evidence in the late trial of W. Palmer, at which he had been present, and had formed a very decided opinion as to the prisoner's guilt. With respect to the chemical evidence, he considered the colour tests, which were so much relied on by Mr. Herapath, capable of acting on very dilute solutions of the pure salt, but were much interfered with by the presence of organic matter ; and he considered it very wrong to represent that the satisfactory application of these tests presented no difficulty to the analytical chemist. Admitting all that could be said of the delicacy of the tests, they were, he asserted, from their very nature, evanescent and unsatisfactory. He commented on the fact that nothing new had been added to previously existing knowledge by any of the chemical witnesses for the defence, and that all the tests tried were mentioned in Dr. Taylor's work, published several years since. It might perhaps be asked, "If Dr. Taylor possessed equal skill and knowledge with Mr. Herapath, why did he not detect the poison ?" In the first examination of the stomach, the circumstances of the case fully excused the oversight ; but he could only account for its non-detection in the soft organs of the body, subsequently examined for mineral poisons, by such an extraordinary prejudice in favour of his own theory, as to blunt his usual acuteness, and prevent the proper exercise of his skill. He thought it probable that some evidence of the presence of strychnia still existed in the body of Cook, but its detection was far from certain, and the failure of another examination would not shake his opinion as to the cause of death.

It was seldom that the toxicologist was called upon to discover two poisons in a body, and to decide on the cause of death. Had Dr. Taylor been at first acquainted with the nature of the symptoms preceding death, there was no doubt he would have obtained abundant evidence of strychnia. Hence the importance, the lecturer said, in toxicological inquiries, of giving every information to the chemist, to guide the course of his investigation ; for, he urged, if the contents of a stomach were tested for all the known vegetable poisons only, the separate quantities afforded for the experiments in search of each poison would be so small, and contain so minute a portion of the poison, as to escape detection. Dr. Taylor was totally ignorant of the symptoms preceding death, and had no clue whatever to the nature of the poison. The first indications he perceived were those of arsenic, but on examination of more material he established beyond a doubt that the body was saturated with antimony; and having arrived at the conclusion that he had already discovered the cause of death, his subsequent tests on the remnant of his materials were made with a view of obtaining negative evidence. The only two chemical witnesses whose views coincided with his own were Mr. Morley, of Leeds, and Dr. Wrightson, of Birmingham ; both of whom, whilst moderate in their reliance on the chemical tests, refused to admit Dr. Taylor's theory of absorption.

In conclusion, Dr. Edwards stated the result of several experiments he had made upon animals, in which he had detected the strychnia after death, but, considering the importance of a question involving the life or ignominious death of a fellow-creature, he would not dare to pronounce in the present state of our knowledge, on the presence of strychnia in human remains, by the colour tests alone, but would require physiological as well as chemical evidence, or that the strychnia should be reproduced in some form recognizable under the microscope. In every case in which he had detected strychnia by chemical tests, he had been able to confirm them by the physiological means suggested by Dr. Marshall Hall, *Pharm. Journ.*, vol. xv. p. 376, which he considered quite trustworthy.

After the lecture, small doses of strychnia were administered by Dr. Edwards to a rabbit, a mouse, and several frogs, which quickly exhibited the effects of the poison in a very striking and satisfactory manner. The thanks of the Society were voted to him by acclamation for his interesting lecture and experiment, and the meeting separated.

The President, on leaving the chair, congratulated the meeting, which was very numerous, on such a satisfactory conclusion of a very successful session.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

At a meeting of the Committee, held June 12th, the following gentlemen were unanimously elected officers of the Society for the ensuing year : — President, Mr. J. R. Lynch ; Vice-President, Mr. W. S. Brown ; Treasurer, Mr. J. Taylor ; Hon. Secretary, Mr. W. Wilkinson ; Auditors, Mr. Bingley, Mr. Tomlinson.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE PRACTICAL EXAMINATION OF THE QUININE SALTS.

BY MR. R. W. GILES.

I FIND the following statements in a pamphlet sedulously distributed amongst the medical profession, for the purpose of attaching the charges of ignorance and fraud to the Pharmaceutical body, in consequence of which it is alleged that a disgraceful system of adulteration prevails:—

> "Citrate Quinine and Iron.—Many samples contain a mere trace of quinine, others none whatever. *Quinidine* is used instead of quinine, hence the pseudo-crystalline salt, sold for citrate of quinine and iron, is merely a substitute comparatively worthless. No test is known at present for detecting this fraud.
>
> "Quinine.—Sulphate of quinine is adulterated with fifty or sixty per cent. of quinidine, a comparatively worthless article. Sulphate of quinidine is manufactured in England to a large extent."

It is not my present purpose to impeach the veracity of these gross accusations, misrepresenting as they do the actual condition of important medicinal preparations; but when it is asserted that quinidine is so largely employed in adulteration, and that there is no means of detecting it, it would seem a fitting occasion for bringing under notice those tests which *we* believe are *practically sufficient*, and I therefore beg to submit a short sketch of the processes upon which I have been accustomed to rely for the examination of quinine for the usual possible contaminations.

The substances to be looked for in sulphate of quinine are cinchonia, quinidine, sugar, salicine, earthy salts, fatty matter (the latter upon the authority of Dr. Pereira).

Cinchonia.—Put two grains sulphate of quinine in a test tube, and pour fʒj liq. ammonia on it (to set free the alkaloid); and fʒj ether, and agitate together. If the liquid becomes clear, the absence of cinchonia is proved; cinchonia being insoluble in ether, while quina is soluble to the above extent.—*Dr. Pereira.*

Quinidine.—Put six grains sulphate quina in a stoppered bottle, and add to it fʒiv rectified spirit; let it macerate for a few hours with occasional agitation; decant accurately fʒij, and allow it to evaporate spontaneously in a watch-glass until perfectly dry. The residue should weigh 1.2 grains. If it greatly exceeds this weight the presence of quinidine may be inferred (the absence of cinchonia having been ascertained by the first experiment).

Sugar.—Precipitate a solution of sulphate of quina with ammonia, and evaporate the filtrate. It should be entirely dissipated by the heat of a spirit-lamp without blackening towards the end of the process—proving the absence of soluble organic matter, including sugar.

Salicine.—Place some of the suspected salt on a porcelain slab, and touch it with a rod moist with sulphuric acid. The presence of salicine will be indicated by a bright red colour, while a pure specimen will be unaffected.—*Dr. Pereira.*

Earthy Salts.—Sulphate quinine dissolves without residue in rectified spirits; as earthy salts generally, and especially sulphate lime, are insoluble in this menstruum, they would remain apparent.—*Dr. Pereira.*

Fatty Matter.—By its complete solubility in dilute acids, the absence of fat is ascertained.—*Dr. Pereira.*

To determine the presence of the proper alkaloid in citrate quinine and iron, precipitate with ammonia; if the precipitate is soluble in ether, cinchonia cannot be present. If the precipitate (previously dried) dissolves in twice its weight of boiling rectified spirit without depositing anything as it cools, we may be satisfied that quinidine (which crystallizes out under these circumstances) is not present.

If the sample under examination should not answer satisfactorily to these tests, I should reject it without further inquiry; if there were any especial reasons for an exact analysis, it would of course be easy by the application of the same principles to separate and estimate quantitatively either or all of the impurities in question. Although there is no new discovery involved in the foregoing processes, I believe that some of them have not been published before in the practical form in which they are now presented, and if any of them are capable of replacement by others more conveniently applicable, no one will be more pleased than myself in being informed of them.

Clifton, June 16th, 1856.

THE CHEMICAL TESTS FOR STRYCHNIA.

BY MR. WILLIAM COPNEY.

PERHAPS there is no class of the community, the attention of which has been more properly arrested by the Rugeley tragedy, than that of Pharmaceutical Chemists. To them is entrusted the responsibility of preparing, keeping, or dispensing the potent drug, which, by a verdict not of the jury only, but almost of the entire country, was the agent by means of which the poisoner effected his foul purpose.

Whatever opinions may have been entertained as to the necessity and importance of a befitting education on the part of those who are in the habit of compounding medicines containing, in many instances, ingredients of the most energetic nature, there are none, at the present time at least, who would be disposed to call in question its utility. It is not, however, a matter of education only—it is not merely necessary that the Pharmaceutist should be able to *recognize* the potent agents which surround him, by the physical and chemical properties which distinguish them, or that he should be familiar with their ordinary doses; there rests upon him a moral responsibility: rigid and unceasing care, order and accuracy, must ever be added to chemical knowledge.

In whatever state the recent event found the knowledge of the Pharmaceutist in regard to the characters of strychnia, so much has been said and written about it, that, now at least, it is an element of the Materia Medica with which he may be supposed to be especially familiar.

To those, however, who have not repeated for themselves the tests by which it may be infallibly recognized, or to those who, having done so, are yet in doubt as to their delicacy, the following may not be unwelcome.

It is not intended to offer any opinion as to whether strychnia, after its exhibition as a poison, and when death has ensued from a *minimum* quantity—when that quantity has been so nicely adjusted that the whole is absorbed before death takes place, or whether, when the body is in a state of advanced decomposition, it may, or may not, be always extracted, but simply to assert the extreme delicacy of the chemical tests; such delicacy indeed do they possess, that it may be fairly stated, that in every case where these give no indications, one of three things must obtain—either that no strychnia had been taken, or, that it cannot *always* be extracted, or, that the process adopted for its elimination was faulty.

Organic poisons, as a class, are admitted on all hands to be less readily recoverable, and even when obtained, to be with much less certainty distinguished than the inorganic. Every practical Chemist knows, that when some of these have entered into combination with other substances, more especially gallic or tannic acids, they are separated with the utmost difficulty. The detection of strychnia, however, is less uncertain; perhaps there is no substance with which the toxicologist has to deal, not excepting arsenic, which displays such distinct and constant features as this.

The principle of the tests is the supply of nascent oxygen; almost any substance, therefore, which will supply this element, when acted on by sulphuric acid, is suitable for the purpose. The same in principle is the application of the galvanic current as proposed by Dr. Letheby, which, moreover, has the advantage of being free from all fallacy dependent upon the presence of other bodies.

There are two conditions necessary to the success of the test—that the strychnia should be obtained in the state of dryness, and that the sulphuric acid employed should be concentrated, not of a lesser specific gravity than 1.840. An acid whose density is 1.500 is still better.

The substances hitherto employed are binoxide of lead, binoxide of manganese, chlorate of potash, and bichromate of potash. According to my experiments the chlorate of potash is the least valuable, much better the binoxide of lead, better still binoxide of manganese, and best of all, bichromate of potash.

The first thing to be done is the preparation of a solution of strychnia of determinate strength—one grain in 500 minims is a convenient proportion. The solution is readily effected by using equal proportions of rectified spirit and distilled water acidulated with sulphuric acid.

Place one minim of this solution upon a clean white porcelain capsule, and evaporate at a gentle heat to dryness, now add a drop of sulphuric acid, and intimately mix; introduce a small fragment of bichromate of potash, and draw it across the spot. Where the quantity of strychnia is as great as in this experiment, *i.e.* the $\frac{1}{500}$th of a grain, a saturated solution of the bichromate may be used, and is, in some respects, better, but it is necessary to use it judiciously; a pointed glass rod is dipped into the solution, and enough allowed to remain upon it without dropping; wherever the point of this touches the mixture, the colour is developed. This colour is blue, which is succeeded by purple, crimson, red, and green, the latter in some instances being eventually replaced by yellow. (These colours are well seen if a small fragment of strychnia be placed in a narrow test tube, and a sufficient quantity of sulphuric acid added to smear the inner surface on inclining and turning the tube about. A little pounded bichromate of potash being introduced, and the tube held so as to trail the acid over it, the most magnificent colours are brought out.) A given quantity of the solution is now mixed with an equal proportion of distilled water, each minim then containing a thousandth part of a grain; from the solution thus formed, it is easy to obtain others of any degree of dilution that may be desired. This dilution may be carried to such an extent, that the 1—500,000th part of a grain may be faintly detected, beyond which I have not succeeded. The method by which this latter quantity was shown, is as follows: prepare a solution of such a strength that one minim shall exactly equal the 1—125,000th of a grain. Draw out a glass tube of narrow bore to such a degree of fineness, that twenty drops from it shall equal five minims. Allow one of these drops (*i. e.* a quarter of a minim = 1-500,000th of a grain) to fall in the centre of the capsule. Evaporate carefully without stirring, and test as before. The strychnia will be found, upon close inspection, to have collected itself into a ring more or less complete; wherever this is crossed by the test, the colour may be faintly seen. The object of using a quarter of a minim, is to circumscribe the deposit; for the same reason it is not stirred during evaporation. No chemist would perhaps be disposed to assert an opinion upon the faint colour afforded by this experiment, which is only put forth as an evidence of the extreme delicacy of the test.

Antimony was found in the body of Cook. A question arose as to what effect this might have in causing the elimination of the poison, either through the kidneys or other channels; or supposing some strychnia still to remain, to what extent it would mask or prevent the action of the tests. The latter part of this question is, I think, undoubtedly disposed of. The most decisive experiments on this point are perhaps those of Mr. Rodgers. In all cases the strychnia appears to have been recovered unchanged. Whatever effect the presence of antimony, in any of its combinations, might seem to have while in actual contact with strychnia, there need be no longer any doubt that it may be separated from it, and even shown, more or less distinctly, while mixed with it.

It may be here observed, that although the suggestion claimed attention from the importance of the subject, both *per se* and in reference to the culprit, it was one which has been truly said, would not, at any other time, have received a moment's consideration. It is not usual for a chemist to apply the tests for any body, at least in toxicological inquiries, while others, which may by possibility be separated from it, are still present.

It must be confessed, however, that some good has arisen out of the inquiry; and it is possible that there is something yet to learn about it. One thing has been undoubtedly shown—that the solubility of strychnia (in water) is greatly increased by the presence of tartar emetic.

The following experiments may not be uninteresting:—

1. One grain of strychnia and ten grains of tartar emetic were boiled in an ounce of distilled water. Nearly a clear solution was obtained. When cold, crystals were deposited, which, on being tested, showed the presence of both antimony and strychnia, the latter almost more distinctly than by itself. The crystals were remarkable; they were neither the prismatic crystals of strychnia, nor the octahedra of tartar emetic, but apparently some combination of the two substances.

2. One grain of strychnia and ten grains of the orange sulphuret of antimony were boiled as before. When cool, no crystals were obtained, but simply a deposit, apparently identical with the sulphuret. On testing this, the presence of strychnia was shown even through the orange-coloured mass. The object of using this substance was to learn whether antimony, when in combination with sulphur, a circumstance not unlikely to happen in the decomposing body of Cook, would in any way affect the strychnia.

3. One grain of strychnia and one grain of tartar emetic were boiled in two ounces of distilled water. Very nearly the whole of the strychnia dissolved. No crystals were deposited on cooling, but a slight amorphous deposit, rich in antimony, had collected upon the surface of the dish. A portion of the liquid was evaporated and tested for strychnia, which was shown most distinctly. The liquid was now examined for antimony; on adding sulphuretted hydrogen very faint traces were shown; for greater certainty, some of the liquid was transferred to a clean Marsh's apparatus—antimoniuretted hydrogen was obtained, which, being burnt, afforded a stain, which was subsequently found to be antimony. To the rest of the liquid, ammonia was added; after a short time, long shining needles were formed, these, being separated by filtration, were found to be strychnia.

Perhaps the point most worthy of notice in this experiment, is the greatly increased solubility of strychnia in presence of antimony, which gives rise to thoughts as to what might take place in the yet living body—how far the system might be drained of the poison by the energetic eliminating powers of antimony. Not unworthy of attention also is the nature of the compound formed, and which is retained in the solution.

4. A drop of a solution, which contained the $\frac{1}{250}$th part of a grain in each drop, was placed in the centre of a capsule and carefully evaporated; a quarter of a grain of tartar emetic was added and two drops of sulphuric acid; these were intimately mixed; on adding the bichromate of potash very indistinct evidence of strychnia was given. By using more bichromate of potash and a little more acid, the colour was somewhat more developed, but only for an instant, the whole quickly becoming green. On repeating this experiment several times, in varying proportions, it was found, that although the evidence of strychnia was rarely entirely lost, it did not give satisfactory proof of its presence. Thus it was, it may be presumed, that in the earlier experiments, the presence of antimony (tartar emetic?) was supposed to invalidate and render the test useless. But, as before observed, no chemist would think of testing for a substance under circumstances like these. There is a long list of substances which would act in a similar manner, in fact, any body capable of

deoxidizing the chromic acid liberated by the sulphuric, will mar the test more or less. In this instance, it may be presumed, that the oxide of antimony set at liberty by the sulphuric acid, is raised to a higher oxide (antimonic acid) at the expense of the chromic acid. The strychnia, however, in every case remains unchanged, and is there still—by supersaturating with ammonia, as recommended by Mr. Rodgers, and agitating with chloroform, the strychnia is recovered, in no way the worse for its companionship.

Discarding theory, an experiment was made to ascertain whether, after the colours have been produced in the ordinary manner, the strychnia may even then be reproduced, which ended in a negative result.

To determine further, whether the prevention or masking of the test, when tartar emetic was present, really depended upon the oxide of antimony, an experiment was made, in which bitartrate of potash was added, in lieu of the tartar-emetic—these elements (potash and tartaric acid) being in combination with the antimony. As anticipated, no effect whatever was produced, the colours coming out as perfectly as though this body had not been present.

While these experiments were being proceeded with, a bottle containing strychnia and some strong solution of sulphide of ammonium, was brought to me by Mr. John Randall, of Portman Street, who had mixed these ingredients together, and had submitted the mixture to an elevated temperature for some hours, with a view to ascertain what effect this agent might have upon the poison, as one with which the latter might come into contact in the case of decomposing structures. On evaporating a small portion of it in a watch-glass, and testing in the usual manner, no satisfactory evidence of strychnia was afforded, less even than in the case of tartar emetic. Believing that this result might be due to the presence of sulphur acting analogously to the oxide of antimony, a little dilute acid was added to a portion of the same solution. The sulphur separated; on filtering the liquid, and evaporating a little of the filtrate and testing it as usual, the presence of strychnia became distinctly evident.

St. Mary's Hospital.

Since the preceding was in type, a letter, read before the Royal Society, signed W. B. Herapath, has come under my notice.

This eminent toxologist states that by the formation of Iodo-strychnine "it is possible to recognize the 10,000th part of a grain of strychina in solution."

The crystals are recognised by their optical properties when examined by the polarizing microscope.

PUMP WATER.

We have often stood and contemplated a parish pump, with its stream, so bright, so pure, always ready to flow when wanted, and then reserving itself for the next comer. The neighbours send their pitchers to be filled, small boys quench their thirst at the iron ladle; the water supplied by the Companies may be good enough for ordinary purposes, but for the luxury of a refreshing draught of bright spring water, everybody goes or sends to the pump. True, it is rather hard, and therefore not suitable for washing, but spring water is usually hard, and to the taste it is no worse on that account, or if it were it might be softened by boiling. The freedom from organic impurity (vulgarly called dirt), and the limpid brightness, constitute its attraction, and the pump is surely a public benefactor.

Yet, in the midst of this train of thought a doubt arose. Why is the water so bright and pure? It ought not to be so. The locality would lead to a different supposition, for almost under the pump-handle there is an iron grating, the receptacle of the muddy contents of the gutter—the washings of the street—the filth from the neighbouring houses, running down the sewer into the Thames; and yet the water from the pump is clear as crystal. Does this arise from a provision of nature—the filtration of the water through the soil, or is the system of drainage as perfect as the arterial circulation in the body, which allows the pure blood to pursue its course uncontaminated, while an impure stream passes through the stomach and intestines? Satisfied with this explanation of the mystery, the pump regained our confidence. This was rather confirmed than otherwise, by an accident which occurred a few years ago. The water of one of the parish pumps was found to be foul. It was discoloured, and had an offensive smell. A sewer in the neighbourhood had recently been repaired, and it was found that by carelessness or accident during this process, an escape of sewage liquor into the well had taken place. Many efforts were made to purify the well, but to no purpose; a communication had been opened between the sewer and the well, the mischief appeared to admit of no remedy, and it was found necessary to remove the handle of the pump.

Other cases have occurred in which a temporary impurity of the water has been observed during the summer when a well has been almost dry, or from some casualty which has been discovered and rectified. From these circumstances, and the supposed purity of the pump water in general, it was naturally inferred that, for all practical purposes, the chance of contamination was sufficiently guarded against, and that accidents of the kind referred to were of rare occurrence, and in general, easily rectified.

Doubt has recently been thrown upon this view of the case. Dr. Thomson, Medical Officer of Health to the parish of Marylebone, has directed his attention to this subject, and has chemically examined the water of several of the parish wells. On inquiry in different districts it is ascertained that these casualties are not unfrequent; and since the publication of a caution to the parishioners in the weekly sanitary reports, several samples of well water have been brought to Dr. Thomson, containing in suspension fœcal matter and other organic impurities, obviously derived for the sewers. From the subjoined extracts of Dr. Thomson's reports, it would appear that the water supplied by the water companies at the present time is in general less impure than the well water of the metropolis, the latter having been found, in several localities where it has been examined, to be unfit for domestic use.

The subject is one of considerable importance, affecting as it does the public health, and the result of the chemical analyses shows the necessity of attention to the state of the water, whether from wells or other sources, especially in crowded localities.

WATER.—WELLS.—(*Report, May* 10.)

BY R. D. THOMSON, M.D.

It has appeared to me that, in the performance of my duties as guardian in some measure of the public health, I should bring before my fellow-parishioners such conclusions as result from laborious investigation, and which seem to me to strike at the very foundation of the health of those who are not aware of the difficulty of discriminating between wholesome and pernicious alimentary substances. It was with this object in view that the previous Reports have contained allusions to the condition of water and milk, as employed by the community in this parish. Finding that considerable use is made of the forty-four pump waters distributed throughout the district, under the erroneous impression that they are pure and wholesome, I have analysed one well from each sub-district, and now present the results to the Vestry, in order that the impure source of such supplies may be thoroughly understood; and that henceforth their domestic employment may be avoided by all those who value health as one of the greatest of earthly blessings, and as a gift which, in reference to the present subject, we may be said to hold, in some respects, in our own keeping. When we evaporate half a gallon of rain water in a white basin, and examine what remains, we shall find insignificant traces or spots deposited on the clean surface; when the same bulk of river water has boiled away, a distinct residue is apparent, which varies in amount in different streams according to the nature of the soil over which the current travels; but when we examine an equal volume of well water, especially in a city, the remainder is comparatively enormous. The explanation of the differences is sufficiently simple.

The water in each of the three instances was originally derived from the clouds; the rain water could only dissolve such traces of soluble materials as it met with in its descent through the atmosphere, while the river water, coming in contact with the earth and taking up all soluble substances which it encountered in its course, became more impure in proportion to the length of its channel within certain limits. City well water is the most impure of all, because it has fallen on areas and streets teeming with animal refuse, both solid and fluid, in various stages of decay; it has penetrated the soil saturated with disgusting excretions and débris, and, dilatorily infusing, has ultimately been detained in the pits which have been sunk under the name of wells, and which are therefore filled with the drainage of the filthy city surface. Not only, however, do these wells contain the drainage of the surface, but they are likewise contaminated with the oozing sewage which penetrates through the contiguous porous drains, and sometimes makes its way in such quantities into the wells as to render the water obnoxious to the eye and likewise to the sense of smell. This has recently occurred in one of the Oxford Street wells, and while the fact affords strong evidence of the unwholesome character of the pump water, it demonstrates the importance of preventing the sewage from percolating the subsoil of London through brick drains and porous pipes, since by such imperfect means of conduit the organic débris of the population is retained in the saturated spongy soil under our feet, to pour forth its noxious exhalations during the heats of summer, and to contaminate the atmosphere which we breathe with the essence of disease. The following table contains a view of the composition of six wells, from different sub-districts. The ingredients are stated in degrees or grains of impurity per gallon.

Sub-districts	1. All Souls.	II. Cavendish Square.	III. Rectory	IV. St. Mary.	V. Christ Church.		Thames at Thames Ditton
	°	°	°	°	°	°	°
Organic Impurity	25.76	19.44	15.84	25.2	30.00	33.20	2.46
Inorganic Impurity	121.84	67.92	52.16	75.28	64.40	80.64	18.08
	°	°	°	°	°	°	°
Total Impurity	147.60	87.36	68.	100.48	94.4	113.84	20.54

The wells are situated as under:—

I. Great Titchfield Street, corner of Mortimer Street. II. Marylebone Lane, at Oxford Street. III. High Street, near St. Marylebone Church. IV. At St. Mary's Churchyard. V. New Street, Dorset Square, and Earl Street, Lisson Grove. The composition of Thames Ditton water, as supplied during April by the Southwark and Vauxhall Company, is introduced in the table for the purpose of comparison. On examining the nature of the pump organic matter, I have extracted from it much nitric acid and a large quantity of ammonia. I made a quantitative estimation of the ammonia in the Earl Street, Lisson Grove water, and found it to be equal to .715 grains of gaseous ammonia in the gallon, equal to 2.02 grains of carbonate of ammonia. This was undoubtedly the produce of the animal débris, and if we consider it as derived from urine, which of all animal products supplies ammonia in abundance, and with the greatest facility, we shall find it to be equivalent to 109 grains of urine in every gallon of water: this is independent of the nitric acid, which would probably indicate the presence of as much more of the same excretion as that stated. In all of the wells which I have examined in the metropolis and other large cities, I have detected invariably ammonia and nitric acid, a sure index of the contamination of these waters with those portions of animals which are thrown off by nature as hurtful to their systems. From these facts, and from a large collection of analyses of city well waters detailed in my Report to the Board of Health (1855), and from the influence which impure water has been proved to exercise in the production of disease, it is impossible to come to any other conclusion than that the shallow well waters of London are to be deprecated for domestic consumption. It would be advisable to shut them up from public use and to employ them for washing or watering the streets.

WELLS.—(*Report, June* 7.)

The facts contained in the last Report, with respect to the nature of the surface-drainage, so frequently used for domestic purposes under the false term of spring water, has, I am glad to find, attracted the attention of the community. I have examined other two wells in the parish, one situated in High Street, Marylebone, and the other in Devonshire Street, both being attached to private houses. The composition of Thames water from above Teddington Lock, as supplied by the Southwark Company, by a mean of five experiments made monthly during the present year, is added for the sake of comparison, while a column is devoted to the constitution of Loch Katrine water, which is upon the point of being supplied to Glasgow, in place of the water of the Clyde, although the water of the latter river contains only half the impurity of Thames water. The ingredients are stated in degrees or grains per gallon.

	Devonshire Street Well.	High Street	Thames.	Loch Katrine.
Organic Impurity	° 17.40	° 45.60	° 3.36	° .82
Inorganic Impurity	86.92	106.4	16.42	1.41
Total Impurity	° 104.32	° 152.00	° 19.78	° 2.23

The subject of a pure supply of water to the metropolis, although it has occupied much attention, is deserving of a still more patient study by the general public than it has yet received. The fatal experiments which have been so long carried on to the south of the Thames, by the use of impure water, are likely now to receive their true interpretation from the recent investigation of the Board of Health, who have shown that the death-rate from cholera, in houses supplied with water from Thames Ditton, was about 3¾ per 1000 inhabitants, while it amounted to 13 per 1000 in houses using water mixed with sewage from the river at Vauxhall, and in which I detected large quantities of animal excretions. The question still remains, to what rate would the mortality have fallen if the inhabitants had been using water approximating to the composition of that of Loch Katrine.—*Monthly Report on the Health and Climate of St. Marylebone.*

ON RHATANY ROOT.

BY DR. SCHUCHARDT.*

The appearance of a small parcel of a peculiar kind of Rhatany Root in the London drug market, in the autumn of 1854, gave me occasion to make a comparative investigation of it with the well-known Rhatany Root of commerce.

The newly imported drug was, as is usual in English wholesale trade, distinguished with the name of the place of exportation, and called *Savanilla Rhatany*, or, as in more recent importations, [*New*] *Granada Rhatany.*

The pharmacopœias of Europe, with the exception of the French, sanction the use of the root, exclusively of *Krameria triandra;* while the *Codex* admits the root of *Kr. Ixine.* The root of the first plant is generally known under the simple name of *Rhatany Root* (*Radix Ratanhiæ*); that of the second plant is distinguished by French druggists as *West Indian Rhatany* (*Radix Ratanhiæ Antillarum*), under which name, brief and somewhat superficial descriptions of it may be found in some scientific journals. The most detailed account, referring, however, only to its external appearance and characters, is that given by Guibourt (*Dictionaire des Drogues simples et composés*, 1829, tome iv., 376), as derived partly from his own investigation of specimens found in French commerce, and partly from observations made on the spot by Tussac, who published a description of it, with a figure, in his *Flore des Antilles.*

Besides this West Indian Rhatany, which almost always occurs in trade *per se*, we find sometimes among ordinary Rhatany other roots, evidently derived from different species, though belonging to the same genus. *Krameria argentea* and *Kr. linearis* have been named as the origin of these roots. I have not, however, yet succeeded in distinguishing with certainty these latter roots, although with a favourable chance for doing so, having had within a few months as much as 8000lbs. of genuine Rhatany before my eyes, with liberty of searching it over. I may therefore pronounce the admixture of those two roots as, at all events, of but rare occurrence. An intentional or fraudulent adulteration of the drug is not easily carried out, on account of the characteristic colour which the genuine rhatany possesses. Martiny has, however, noticed such an one. He found among some genuine rhatany, pieces of a yellowish-red root, having a rough uneven surface, a clean fracture, and a soft wood. Its origin is unknown, and he describes it briefly as *Radix Ratanhiæ spuria.*

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* *Botanische Zeitung*, 3 and 10 Aug., 1855.

Krameria triandra, discovered by Ruiz and Pavon, grows in Peru and Bolivia, half-way up the western slopes of the Cordilleras. It is exported from Lima chiefly to the ports of Europe. It does not appear that we are at present acquainted with any further distribution of this plant on the South American continent.

Krameria Ixine was first found by Löffling on the continent, so is by no means restricted to the Antilles. But its exportation takes place from Martinique and Guadaloupe, whence it is sent to France.

As the port of Savanilla (12° 2′) is in New Granada, at the mouth of one of the lateral branches of the river Magdalena, which flows into the Caribbean Sea, it is situated in a part of America where *Krameria triandra* has not yet been found. This circumstance justified the supposition that the Savanilla Rhatany might be derived from another species; a supposition which, after a careful comparative examination of a quantity of 180lbs. of this drug, I am warranted in saying has become a certainty.*

Both kinds of Rhatany, namely that from the ports of Peru and that from Savanilla, have hitherto been exported in serons of 180 to 200 lbs.

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* With regard to the botanical distribution of the genus *Krameria*, we find in Asa Gray's *Genera of the Plants of the United States*, ii. 225, some short remarks under the head of *Kr. lanceolata*, Torrey. As far as I have been able to gather, there are at present fourteen well-determined species of this genus, viz:—

5 from Brazil..........................	*Kr. glabra*, Spreng. *Neue Entd.*, 2, p. 157.
	" *grandiflora*, A. St. Hil. *Flor. Bras. merid.*, tom. ii., p. 72, t. 97.
	" *ruscifolia*, A. St. Hil.
	" *tomentosa*, A. St. Hil.
	" *Beyrichii*, Hb. Lehm.
3 from Peru	" *triandra*, Ruiz et Pav. *Flor. Peruv.*, i., tab. 98.
	" *linearis*, Ruiz et Pav. *Flor. Peruv.*, i., tab. 94.
	" *cuspidata*, Presl. *Reliq. Haenk.*, ii. 103.
3 from Mexico	" *secundiflora*. *Flor. Mex.*, ic. ined.
	" *pauciflora*. *Flor. Mex.*, ic. ined.
	" *cistoidea*. Hook. in App. ad B. Voy., t. 5.
2 from the West Indies	" *cytisoides*, Cavan. *Ic.* 4, t. 590.
	" *Ixine*, L., p. 177 (occurs also near Cumana, in S. America.)
1 from Florida, Texas, & Arkansas	" *lanceolata*, Torrey. Asa Gray, *Genera*, ii. 225, tab. 185, 186.

The species called by Martius, in his *Pharmacognosie*, *Kr. argentea*, I have been unable to find.

Aug. St. Hilaire, who usually enters so much into detail, mentions nothing about the use of the roots of the Brasilian species; and De Candolle, in speaking of *Krameria triandra*, only says that the root is officinal. Tussac gives a little more information in his *Flor. Antillarum*, in which work (tab. 15, fig. 10, 11) he figures an entire root and also a portion of a root of *Kr. Ixine;* he also gives some account of its uses in the countries where produced. Asa Gray mentions (l. c.) that the root of *Kr. lanceolata*, Torrey, frequently three feet long, is often substituted in the south of the United States for the root imported from Peru, but he gives no description of it. In the Flora of North America of Drs. Torrey and Asa Gray, we find, however, when speaking of the properties and effects of the Peruvian Rhatany, that "the roots of *Kr. lanceolata* are endowed with similar properties as the roots of *Kr. triandra*." I am indebted to the verbal communication of my friend Dr. Matthes for the information that during a residence of many years in Texas, he had known but few instances of the root of *Kr. lanceolata*, there a common plant, being used in medicine.

For the sake of brevity, I shall designate the Peruvian root *Payta Rhatany*, a name under which it figures in the English official lists of imports; the new drug I shall call *Savanilla Rhatany*.

The opinion of Mettenheimer (*Archiv. der Pharm.*, 53, II. 180) that it is almost impossible for *Radix Nanary* to come into trade as a spurious rhatany, as supposed by Wiggers, I perfectly agree with. The difference between the two roots is too striking not to be observed at once.

The seron of Savanilla Rhatany which I examined, consisted entirely of one sort; while in most serons of Payta Rhatany I have observed that, apart from the difference which might occur in the same root when collected at different times of the year, or when exported from different places, it varied very materially in the same seron, young and old root-stocks differing greatly in the colour, size, number, and length of their roots, being all mixed together.

Druggists are in the habit of distinguishing two sorts of Payta Rhatany, one sort *stumpy* or *short*, and another designated as *long*. If the root-diggers bestow the needful care in removing the roots from the soil, the *long* variety of the drug will be obtained; while in the *short*, stumpy, or chumpy form, it is plainly indicated that the shrubs have been torn from the soil with force, and that sufficient regard has not been had carefully to extract the long, creeping root. The *long* Rhatany is preferred to the *short* or stumpy variety. The stumpy sort occurs in pieces, from the lower part of which proceed numerous roots, some running in a perpendicular, but more in a tolerably regular horizontal direction. The aerial stem varies very much in length and thickness, as do likewise the length, thickness, number, and direction of the roots. In most cases, the stem of the Rhatany plant is cut off a few inches above the ground; its thickness varies from $\frac{1}{4}$ of an inch to 3 inches; it is not always perfectly cylindrical, but frequently irregular and knotty. One seron contained roots evidently collected with very little care, since to some of them, branched or simple stems from 1 to 2 feet long were still attached. The longest aerial stem which I had the opportunity of seeing, measured 26 inches. Another and upright stem whose base of $3\frac{1}{2}$ inches in diameter, branched into three nearly equal shoots, was covered here and there, and especially on its broken ends, with a grey epidermis, upon which, besides some blackish *Verrucariæ*, there was a dark-fruited *Lecidea*, with a green thallus. Another seron contained principally the roots and stems of younger plants, which, at scarcely one inch above the ground, had divided into numerous branches and twigs, the latter clothed with a dense covering of long, silky, white, adpressed hairs. The foliaceous, thin, brittle, brown bark, is easily detached. The youngest branches still retained here and there the small oval leaflets, invested with the same covering of hairs as the branches. According to the testimony of travellers, the rhatany plant is easily recognized, even at a distance, not only by its bright red flowers, but also by the silky, shining pubescence of the leaves. Under the microscope this pubescence is seen to consist of densely-crowded, long, one-celled, colourless, thick-walled, hollow hairs.

According to the age of the plant, we find a difference in the external appearance, and more or less in the internal structure, of its stem—less so, however in the roots, which, to us, are of more importance.

The aerial stem of the young plant is covered with a reddish-brown, rough, but slightly wrinkled bark, which closely adheres to the wood. A transverse section shows the layer of bark strongly distinguished by its internal red colour from the yellowish white wood. In older stems the bark assumes a somewhat different colour from a mixture of dirty brown, but the wood remains the same. In old stems, however, having cortical matter to the thickness of a quarter of an inch, a very different external appearance is presented, such, in fact, as we have noticed on the trunks of old oaks. Deep horizontal and perpendicular fissures divide the bark into a number of irregular elevated portions. The perpendicular fissures are broader and more open, but less deep than the horizontal, which sometimes penetrate down to the wood of the tree. The connexion between wood and bark is usually very weak; it therefore frequently occurs that in handling the roots portions of the bark break off. It often happens that a seron of 180 lbs. contains twenty pounds of loose bark. As the active principles of the root-bark are, to some extent, present in the bark of the stem, it formerly occurred that the [stem-]bark was sold by itself or mixed with root-bark. Martius and other writers on Materia Medica mention this; it seems, however, that the bark has not been a regular article of trade, but merely introduced as an experiment.

As regards the root proper, which in its native country is used for the same purposes as with us, we cannot, like many writers on Materia Medica, draw a distinction between the structure of the principal and secondary roots. From the root-stock issue a number of roots, which shoot in different directions, but with a tendency to assume very soon a more horizontal course; they are undulating, cylindrical, and, as before remarked, exceedingly variable in length, according to age and locality. The roots of the stumpy sort of rhatany never equal in length those of the so-called *long* sort,—a natural consequence of the greater care bestowed in the collection and packing of the latter.

It appears that upon the spot, neither the young nor the old plants are specially chosen for obtaining the long roots. The roots required in this state are extracted from the ground with some care; each bunch while fresh is separately doubled in two, like sarsaparilla, and then, after awhile, again bent in two, a bundle being thus formed, round which a long root is twisted a few times. This rather careful plan of packing obviates the unavoidable splitting off of the bark and the breaking and bruising of the roots that is noticeable in the stumpy form of the drug. The length of these small bundles varies according to the strength and the number and length of the roots of the shrub. I have seen them from seven to fourteen inches long and weighing from three to ten ounces. A stem 1½ inches thick, and three inches high, with three roots measuring respectively twenty-six, twenty-nine, and fifty-nine inches in length, and three-quarters of an inch at the thickest part, had been formed into a bundle ten inches long, which was tied together by the ends of their longest root, which ends branched off at a distance of fifty inches from the stem.

(To be continued.)

ON CHINESE ALUM.*

About eleven hundred tons of alum have been exported [from Ningpo] within a short period, chiefly to India. This mineral is largely employed by the Chinese in dyeing, and to some extent in paper-making as with us. Surgeons apply it variously after depriving it of its water of crystallization, and in domestic life it is used for precipitating vegetable substances suspended in potable water. It is used also by the Chinese in a manner peculiar to themselves. Fishermen are usually provided with it, and when they take one of those huge thizostoma, which abound on the coast, they rub the animal with the pulverized styptic to give a degree of coherence to the gelatinous mass. Architects employ it as a cement in those airy bridges which span the watercourses. It is poured in a molten state into the interstices of the stones, and in structures not exposed to constant moisture the cohesion is perfect, but in damp situations it becomes a hydrate and crumbles, a fact of which the whole empire was officially informed by the government about thirty years ago. It was discovered that water had percolated into the mausoleum of Kiaking, having been built too near to the mountain-side, the alum cement imbibed moisture, segregated, and opened the way for to enter the tomb. In those peaceful days such an event was of such importance as to call forth edicts and rescripts, memorials and reports in succession for several months. The son-in-law of the deceased monarch, to whose care the construction of the edifice had been entrusted, was fined and degraded, and a statesman from Foh-kien, acquainted with the properties of alum, was appointed to remove it a short distance from the mountain.

Alum was first introduced into China from the West, and until a comparatively recent period, the best kind, called sometimes Persian, and at others Roman alum, was brought from Western Asia. Numerous localities where an inferior article is manufactured, are mentioned in the Pharmacopœia, viz., Shan-tung, Shan-se, Kiang-su, Hu-kwang, Sz'-chuen, also in the south-western frontier and in Tibet. That from Sz'-chuen is represented as having the property of converting iron into copper, or of coating iron with copper, by placing the former metal in a solution of rice-liquor and alum, the stone of that province. The most recent editions of works on Materia Medica contain no reference to the mines in this province, the products of which have surpassed in quality the foreign, and rendered its importation unnecessary. From this and from other circumstances, it is certain that the works, which we shall now describe, have not been long in operation. They are in the Sung-yang hills, bordering on Foh-kien, in the district of Ping-yang, Wan-chau prefecture, and in close proximity to Peh-kwan harbour (27° 9′ 10″ N., 120° 32′ 6″ E.).

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* *Dr. Macgowan's Chinese Serial* (published at Ningpo), quoted in the *North China Herald*, Feb. 23, 1856.

The locality has been visited by one foreigner only, to whom we are indebted for most of the following particulars. About two months ago he started from Chih-ki, bight in Lannai harbour to which Ningpo boats resort for this commodity to the northward of Peh-kwan. Three hours' hard walking over a succession of precipitous hills crossed by stone steps and pathways, brought him to the mines. Ten alum-making establishments were in operation, which, with the exception of one on a hill opposite, occupied about a mile of the side of a lofty hill. The works were adjacent to the quarries from which the alum-stone seemed to crop out of decomposed rock of the same lithological character. The stones were thrown into a fire of brushwood, where they burnt with a slight lambent flame, and as they cracked, the fragments were raked out, broken into small pieces, and macerated in vats. Subsequently the disintegrated mineral was thrown with water into a vessel having an iron bottom and sides of wood, and boiled for a short time. The lixivium was then poured into large reservoirs, where it crystallized into a solid mass. Blocks of alum weighing about fifty catties each, were hewn out of the reservoir and carried in this state in bamboo frames, one on each end of a porter's pole to the place of shipment, where it is broken into fragments. When not designed for immediate exportation, the blocks are stored away for drying. On reaching the depôt, the alum is found charged with a double quantity of moisture, the porters being obliged to deliver a certain weight, they slip their burdens in the mountain streams which they pass in their journey. Judging from the number of labourers engaged in transporting the mineral on the day of our informant's visit, the quantity brought from the works could not be less than eighteen tons. This was represented as less than an average day's work, as labour was in such demand just then for agricultural purposes, that double pay was given, and aged men and women, with boys and girls, were pressed into the service. Assuming that day's product as a basis for calculation, and making an allowance for rainy days, we may safely estimate the annual supply as between five and six thousand tons. The quantity consumed by the dyers of Ningpo prefecture alone, being nearly twenty-two tons per annum, is corroborative of this estimate. The supply is literally inexhaustible. Five dollars and a quarter a ton at the landing would afford the manufacturer a fair profit. It often fetches much more, as there has been an increasing demand for the article, owing to the greater facilities afforded for exportation from Ningpo in foreign vessels.

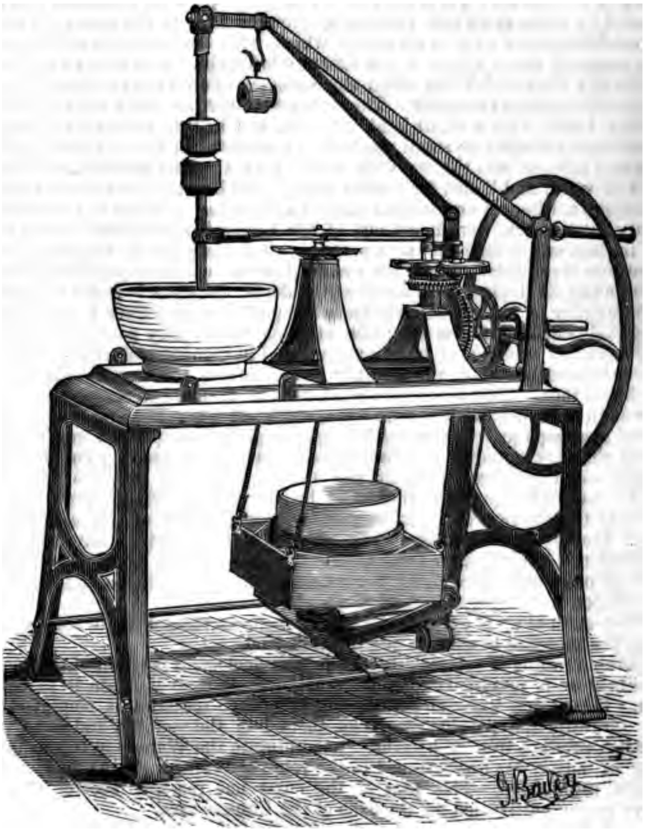
The Wan-chau alum is equal to the best Roman,—a roseate tint in some specimens indicates the presence of minute quantities of iron.

We have no means of ascertaining the precise geological position of the rock from which this alum is procured; some circumstances seem to indicate it to be a new mineral. It is stated that no potash nor any other material is employed in the works. Granitic and porphyritic rocks abound in the vicinity, and some parts of the district produce iron and silver. According to the Wan-chau topography, the working of silver was discontinued in the reign of Wan-lih (1615), in consequence of imperial prohibition. This part of the coast has recently become the seat of extensive poppy cultivation for the bane of the Chinese race.

As a contribution to the physical description of the alum district, we would add that the typhoon of September last was preceded by a rising of water in wells and ponds many miles inland. When the cyclone reached the coast it submerged about a hundred square miles, occasioning a vast destruction of life and property. The waters of the sea were retained in the country by strong easterly winds for several days, leaving a strip of land bordering on the sea quite dry.

GOODHALL'S PATENT GRINDING AND LEVIGATING MACHINE.

We have described and figured in a former number of this Journal (vol. xiii. page 212) the original form of Mr. Goodhall's apparatus, which has been found very useful for facilitating the operation of powdering drugs on the small scale, and generally for economizing labour in the use of the pestle and mortar. Some improvement and simplification have been recently effected by Mr. Goodhall in the construction of his apparatus, which the accompanying figure will illustrate, if compared with that previously given as above. The patentee has also combined an arrangement for sifting, at the same time that the operation of powdering is effected, as shown in the drawing.



PREPARATION OF ALUMINIUM, SODIUM, CHLORIDE OF ALUMINIUM, ETC.

Mr. Deville has just published* a detailed account of the experiments with which he has been engaged for some time, with reference to the production of aluminium, in such a state, and at such a cost, as to be practically applicable for various purposes in the arts.

The method that he adopted is essentially the same as that by which Mr. Wöhler obtained this metal—the decomposition of chloride of aluminium by means of an alkaline metal. Sodium was chosen as the decomposing agent, because it is more easily obtained than potassium.

The apparatus used is represented by fig. I. It consists of three cylinders *A*, *B*, *D*, connected by tubes *Y*, *C*, and heated by furnaces *F*, *G*.

The chloride of aluminium is introduced into the cylinder *A*; the sodium is placed in trays, holding about ten pounds each, within the cast iron cylinder *D*. The intermediate cylinder, *B*, contains about a hundredweight of scrap iron, which serves to separate iron from the vapour of chloride of aluminium, by converting the perchloride of iron into the much less volatile protochloride; it also separates hydrochloric acid and chloride of sulphur.

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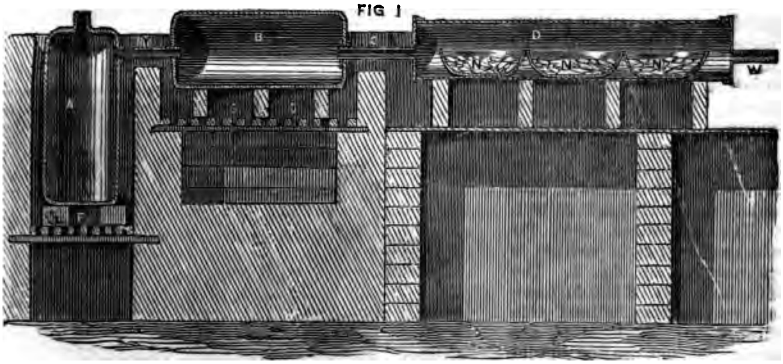
* *Annales de Chimie et de Physique*, xlvi. 415.

FIG 1



While the operation is in progress, the tube *C* is kept at a temperature of 400° to 572° F., and the cylinder *D* is heated so as to be barely red at the under surface; the reaction between the chloride of aluminium and sodium is attended with so great an evolution of heat that it is sometimes necessary to remove the fire entirely.

Very soon after the reaction has commenced, the chloride of sodium combines with the excess of chloride of aluminum, forming a double salt, which is sufficiently volatile to be carried to the adjoining tray, where the aluminium is eliminated by means of the sodium. The reaction does not commence in one tray until it has ceased in that which precedes it, and it is at an end when, on removing the cover (*W*) of the cylinder, the last tray is found to contain, in the place of the sodium, a black mass, covered with a colourless liquid, which is the double chloride of aluminium and sodium. The trays are then withdrawn, and replaced by a fresh charge of sodium.

When the contents of the trays are cold, they are transferred to crucibles of cast iron or clay, and heated until completely melted, and the double chloride begins to volatilize. Most frequently the reaction between chloride of aluminium and the sodium is not completed in the cylinder, the sodium being protected by a crust of chloride of sodium; but a double chloride of aluminium and sodium at the top of the trays is always sufficient to ensure the perfect absorption of the sodium in the crucible, and the aluminium remains finally in contact with a large excess of chloride of aluminium, which is indispensable for the success of the operation.

When the crucibles are cold, the layer of chloride of sodium is removed from the top, and from the lower part the globules of metal are separated by washing with water; but, unfortunately, the chloride of aluminium is dissolved, and exercises a very destructive action upon the metal, so that the globules obtained are not larger than a pin's head. These are collected, dried, put into a crucible, melted, and run into an ingot.

It is necessary to take especial care in removing from the sodium every particle of carbon which is sometimes mixed with it when badly prepared or insufficiently purified, for otherwise considerable quantities of metallic cyanides or cyanates are formed, which disengage ammonia when brought in contact with water, and cause a further destruction of aluminium. It is also necessary to avoid melting the aluminium while it contains sodium, in which case it takes fire. It is always better to melt it together with some of the double chloride of aluminium and sodium.

The sodium was obtained by heating a mixture of carbonate of soda and carbon in an iron vessel. In operating upon the large scale coal is used, and the proportions of the materials that furnished the best result were—

Carbonate of soda (dry)	30
Coal	13
Chalk	5

The characters requisite in this mixture are that it should not melt at the temperature at which sodium is liberated, and that it should acquire a pasty consistence so as to remain in contact with the sides of the vessel in which it is heated. The high latent heat of carbonic oxide and of gaseous sodium prevents the iron vessel from being melted.

These substances are dried, powdered, and sifted; then mixed and sifted again, so as to be intimately mixed. The mixture should then be calcined. By this means its volume is considerably reduced, and when the calcination can be effected by the waste heat of a furnace, considerable advantage is gained.

The apparatus used for the preparation of sodium is represented by fig. 2. The fireplace, *CC*, of the furnace, shown in action, is lined with firebricks; the bars, *G*, are moveable, and the flue should be furnished with a well fitting damper. In the breast of the furnace there is a square opening, *P*, closed by a plate of cast iron, with a hole through which the tube, *T*, may project.

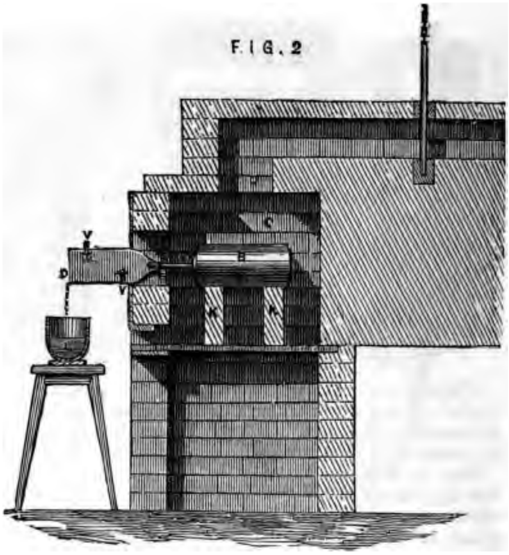


FIG. 2

A mercury bottle, furnished with an iron tube about three inches long, serves as the distillatory vessel. It is supported upon two firebricks, *K*, about four inches high, and hollowed at the top, so as to fit the side of the bottle.

The receiver (fig. 3) in which the sodium is condensed is made of two pieces of sheet iron about $\frac{1}{16}$ inch thick, *A A*. One of these pieces is flat, except at the end, *C*, where it is hammered so as to form a semi-cylindrical hollow. The other piece is turned up at the sides, so that, when fitted to the plate, *A*, there is a space of about $\frac{1}{8}$ inch wide, and a hollow, corresponding to that in the other plate, is hammered at the end, so that together, they will form a collar to receive the conical end of the tube *T*. The edges are filed, so as to fit close, and are kept in their place by two binding screws (*V V*, fig 2).

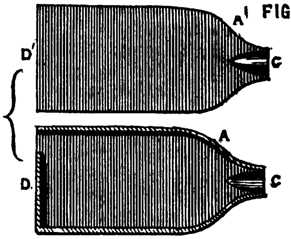


FIG.3

When the bottle containing the mixture is placed in the furnace, and the fire made up, a copious evolution of gas commences; and, after about half an hour, a white vapour of carbonate of soda is deposited, which would seem to indicate that the gas contained sodium. However, the receiver must not be attached to the bottle until a cold iron rod passed into the tube, *T*, is found to be covered with sodium. When the draught of the furnace is good, the sodium is disengaged rapidly, and the receiver becomes so hot that the condensed metal flows out of the open extremity, *D*, where it is received in an iron basin, *L*, containing coal tar naphtha. If, after a time, the receiver should become stopped up, it is replaced by another, previously heated to about 400° or 500° F.

When this operation is well conducted, the sodium obtained is quite pure, and is not accompanied by those carbonaceous substances that are so troublesome in the preparation of potassium.

The operation should be conducted so rapidly that a charge of five pounds of the mixture may be worked off within about two hours.

The temperature requisite for the reduction of carbonate of soda by means of is not so high as has hitherto been supposed ; and, according to the opinion Rivot, is not greater than that of the retorts in the centre of the zinc furnaces Vieille-Montagne.

ı the ease with which the operation is conducted, it might be supposed that reasing the dimensions of all parts of the apparatus used, much larger ies of sodium may be obtained. However, Mr. Deville has found that there ctical objections to this course ; and, after many unsuccessful attempts to rge receivers, he has found that it is preferable to use, with a reduction ;us five times as large as the mercury bottle, receivers of the same ions as in that case.

erating with large reduction vessels, the calcination of the mixture becomes dvantageous, if not indispensable. When the operation is made continuous, ture may be calcined as it is required, and introduced into the reduction ed hot.

vessels used for the continuous operation are drawn iron tubes, four feet x inches internal diameter, and about ½ inch thick. One end is closed by ı plate of iron, with a hole near one side, into which is screwed the discharge at fits into the receiver. The other end of the cylinder is closed by a le iron plug, *O*, with a handle; it is at this end that the mixture is ced.

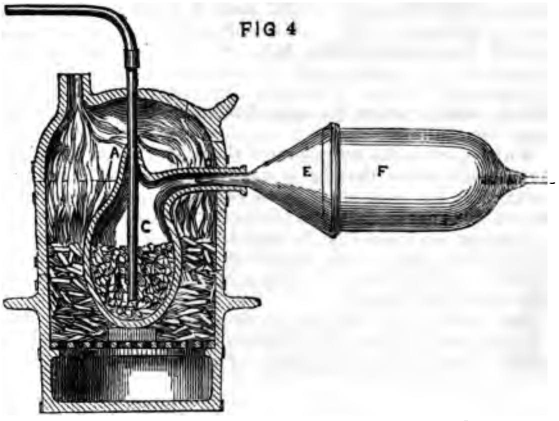
e tubes must be covered with a refractory lute, and an exterior envelope of lay, so as to be entirely protected from the direct action of the fire.

furnace in which the operation was conducted was an ordinary reverberatory , in which the fireplace was divided into two parts by a small wall upon the cylinders rested in the middle, while their ends were level with the outer f the furnace. The fuel was introduced through two lateral openings kept by the fuel upon a shelf outside the furnace. These openings are at such a above the bars of the furnace, that there would be a space of a foot between l and the tubes. The fuel used was a mixture of equal parts coke and coal.

ı the hearth of the furnace, the mixture for the preparation of sodium may ined in crucibles ; and, when the furnace is worked continuously, the ture becomes sufficiently high for working some reduction cylinders upon rth.

Deville did not find the furnace which he used very well adapted for the ion of potassium, and considers that it would be better if constructed after nner of a puddling furnace described by M. Dumas.* He is of opinion that ı no question as to the practicability of the production of sodium by a con- operation, if the furnace is constructed in a suitable manner.

FIG 4



chloride of alu- ı was prepared method recom- l by Gay Lusac henard.† Alu- ıuite free from as mixed with ent. carbon, and ll quantity of ide into a paste, composed at a . The compact as broken into its, and intro- nto an earthen C, fig. 4. This ed in a furnace, ited to redness, stream of dry was passed the contents. At first a considerable amount of water was evolved from the aluminous carbon, which is very hygroscopic. When the chloride of aluminium began to appear, the earthen funnel, *E*, was fitted to the neck, *D*, of the retort by means of asbestos and clay, and a bell-shaped vessel, *F*, fitted in the same manner to the rim of the funnel. The chloride of aluminium condenses in this receiver, and, however rapid the stream of chlorine may be during the chief part of the operation, it is so completely absorbed by the aluminous carbon that the carbonic oxide which escapes does not give any indication of chlorine. However, it contains a little chloride of silicium, arising from the action of the chlorine and carbon upon the material of the retort; also, some aluminium, and, perhaps, some chlorocarbonic acid. When the receiver is full of chloride of aluminum, it is removed, and replaced by another, and so on till the operation is finished.

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* *Traité de Chimie*, Atlas, pl. lxvi., fig. 2.

† *Recherches Physico-chimiques.*

The amount of chloride of aluminium obtained from 10 pounds of alumina was rather more than 20 pounds. The carbonaceous residue in the retort contained some alumina, a considerable amount of alkaline chlorides, and of the double chloride of aluminium and potassium. This residue was washed, mixed with a fresh quantity of alumina, and subjected to the same treatment.

In working the process upon a large scale, pitch was used as the carbonaceous substance; instead of the clay retort, an ordinary gas retort, and, instead of the bell vessel, a small brick chamber, covered with glazed earthenware.

The ammoniacal alum is calcined upon the hearth of the reverberatory furnace, in which the sodium is prepared. After having been heated to redness, it is powdered and mixed with coal tar. The paste is introduced into crucibles carefully covered, and placed in the reverberatory furnace. When the evolution of vapour ceases, the crucibles are removed, and, when it is possible, the aluminous carbon is used while hot.

The stream of chlorine should be so adjusted as to avoid loss either by escaping from the joints of the apparatus or by being carried up the chimney.

Before commencing the operation, every part of the apparatus should be rendered perfectly dry by heating it.

With regard to the utilization of aluminium in the arts, Mr. Deville considers that the necessary condition is its production at a cost considerably less than that of silver. Owing to the difference in density, if aluminium and silver were of the same value, aluminium would be only one-fourth as dear as an equal volume of silver; and, for equal masses, the rigidity of aluminium is much greater than that of silver.

The materials with which aluminium is produced, even by the methods hitherto employed, are all obtainable at small cost. Thus, to produce about half a hundredweight of aluminium, there would be required

Chlorine	237 pounds, costing	....	£2	14	0
Alumina	114 " "	....	0	13	0
Carbonate of Soda	350 " "	....	2	13	0
			£5	0	0

Which would render the cost of the materials for producing a pound of aluminium about two shillings.

With regard to the actual cost of the production of aluminium in these experiments, Mr. Deville states that he is unable to speak decisively; and that the means of working at his disposal were so defective that the experiments made could not furnish an exact indication with regard to this particular.

However, he states that he was able to produce sodium at a cost of three shillings and sixpence per pound, including only the cost of materials, labour, fuel, and retorts. The quantity of sodium made by Mr. Deville at the Javel Works was from 330 to 440 pounds.

The cost of the chloride of aluminium was about one-and-sixpence a pound. Alumina was prepared from ammoniacal alum, and cost as much as two shillings a pound. The quantity of chloride of aluminium made was from 1100 to 1320 pounds.

ON CATECHU AND ITS ACIDS.

BY DR. C. NEUBAUER.

uthor has endeavoured to prepare the tannic acid of catechu in a state of He followed the process recommended by Berzelius for this purpose, in watery extract of catechu is treated with sulphuric acid, and also another in which the catechu is extracted with ether. But notwithstanding the care, he never succeeded in obtaining the acid pure. He has therefore d catechu to a close investigation, especially with regard to catechuic acid, as prepared not only from Bombay catechu, but also from Gambir.

bay Catechu.—The catechu was extracted by ether in a displacement appa- The ether was distilled off in a current of carbonic acid, and the residue *acuo* over sulphuric acid. This residue was extracted with water; it was. ated on the water-bath until it was dissolved; the fluid was then filtered, stand in closed vessels. In twenty-four hours crystals separated; these ined perfectly white by washing with water.

ddish-brown mother-liquors from the first crystals precipitate gelatine; equently contain tannin. Those from the subsequent crystallizations were , but when exposed to the air for a time acquired an exactly similar colour. n these mother-liquors were evaporated to dryness, a substance was obtained haved exactly like the original catechu.

ther took perfectly pure snow-white catechuic acid, which did not produce least precipitate in solution of gelatine, boiled it for three hours in the air, orated it to dryness. The residue was reddish-brown, and dissolved in th a dark colour; this solution again possessed the power of precipitating of gelatine, as had previously been observed by Wackenroder.

second portion of catechu, the author prepared catechuic acid in the usual extracting the substance with water, and treating it with acetate of lead; scribed by Berzelius. The products obtained by this process and by with ether, are identical. The following is the analysis of catechuic acid free from ash, prepared from Bombay catechu by means of ether. The ubstance gave—

C.	52.62	17	102	52.58
H.	6.09	12	12	6.18
O.	41.19	10	80	41.24

' F., the air-dried substance lost 14.34 per cent. When heated above this re, the acid becomes yellow, and at last brownish, constantly losing more in weight, whilst its amount of carbon increases. This is the reason of agreement between the results of the analyses of this substance. When r heated the acid longer than is necessary for the expulsion of the water, it became yellowish, he found that the amount of carbon immediately remarkably. Such acid gave on analysis numbers which nearly agreed of the analyses of Svanberg and Zwenger, as follows :—

	Neubauer.	Svanberg.	Zwenger.
C.	62.62	62.53	62.383
H.	5.24	4.72	4.785
O.	32.14	32.75	32.832

he drying be continued only until the first losses of weight approach catechuic acid loses 14.34 per cent. of water, which nearly represents (calculated, 13.92). Hence the simplest expression for the acid is $+ 3\,HO$.

hor then precipitated a moderately warm colourless solution of catechuic basic acetate of lead. The precipitate could not be dried without change it had a brown colour. Analyses of this lead compound gave—

C.	26.26	17	102	26.16
H.	1.97	9	9	2.30
O.	14.33	7	56	14.32
PbO	57.44	2	223.14	57.22

is the formula of the lead compound will be $C_{17}\,H_9\,O_7 + 2\,PbO$.

The analysis of catechuic acid, prepared by means of water and treatment with solution of acetate of lead, gave—

C.	61.48	17	=	102	61.08
H.	5.14	9		9	5.39
O.	33.38	7		56	33.53

1. *Gambir Catechu, Gutta Gambir.*—From this catechu the author has prepared the acid by means of ether (A) as above, and by the method recommended by Wackenroder (B), in which the powdered gambir is digested with three times its quantity of cold water, the brown solution filtered away, and the residue decocted repeatedly with eight parts of water. A fine product is rapidly obtained by this method. The analysis of this substance, dried at 212° F., gave—

	A		B					
C..........	61.37	61.64	61.18	61.33	17	=	102	61.08
H..........	5.51	5.23	5.10	5.04	9		9	5.39
O..........	33.12	33.13	33.72	33.63	7		56	33.53

These analyses therefore prove that the catechine prepared from Bombay and Gambir catechu by different methods is one and the same substance. The individual products, with the results of their analyses, are as follows:—

Catechuic Acid.	C.	H.	O.
From Bombay catechu with ether	52.62	6.09	41.29
From Gambir with ether	52.52	6.12	41.36
Calculated, $C_{17}H_{12}O_{10}$	52.58	6.18	41.24
From Bombay catechu with ether, dried at 212° F.	61.14	5.27	33.59
From the residue of Bombay catechu, dried at 212° F.......	61.20	5.17	33.63
From Gambir with ether, dried at 212° F.	61.37	5.51	33.12
From the residue of Gambir, dried at 212° F..................	61.18	5.10	33.72
Calculated, $C_{17}H_9O_7$	61.08	5.39	33,53

The author then made some experiments in order to ascertain whether in the decomposition of catechuic acid with boiling dilute sulphuric acid, sugar is formed. These experiments were made with large quantities of pure catechuic acid (A), and of the tannic acid of catechu as pure as possible (B); but in no case did he obtain any sugar.

In the experiments A, 10 to 12 grms. of perfectly white catechuic acid were boiled with dilute sulphuric acid (1 part SO_3HO and 24 parts HO), for three or four hours in an apparatus, into which whatever distilled off could flow back. The catechuic acid dissolved very readily in the dilute acid when heated; the fluid was yellow and clear, but after boiling for a short time began to grow turbid, and this turbidity gradually increased until at last a dark yellow flocculent mass separated in considerable quantity. After boiling for three or four hours, it was allowed to cool, and the cinnamon-coloured substance formed was separated by filtration. The pale yellowish filtrate was freed from sulphuric acid by carbonate of baryta, and filtered; the fluid, which still retained its slightly yellow colour, was then precipitated with acetate of lead. When the excess of lead had been precipitated by sulphuretted hydrogen, the fluid, which of course must contain any sugar that might have been formed, was evaporated to dryness on the water-bath. It furnished only a small brownish residue, which dissolved in water, producing a darker colour. This solution was again precipitated with acetate of lead, and the filtrate, freed from excess of lead, again evaporated to dryness. The residue was now colourless, and consisted of a small quantity of acetate of baryta, which contained no intermixture of sugar.

In the experiment B, with the tannic acid of catechu, he adopted a method similar to that employed by Strecker in the treatment of the tannic acids. Bombay catechu was extracted with ether, the etherial solution agitated with water, and then evaporated to dryness. The residue was dissolved in water, and the brown mother-liquor separated by filtration from the catechuic acid, which crystallized from the solution on cooling. The solution thus obtained was allowed to stand for a long time in an open vessel; a small quantity of a brown substance separated, but no catechuic acid. After filtration the solution was precipitated by sulphuric acid, which was pretty readily effected at this degree of concentration; the precipitate produced was collected on a filter, washed several times with sulphuric acid, then strongly pressed, and afterwards boiled for several hours with dilute sulphuric acid. At first the compound formed a clear solution; but after boiling for a short time, the separation of a brown body commenced, and gradually became very considerable. In proportion as this body separated, the fluid became paler, and the boiling was continued until the solution only exhibited a slight reddish colour. After filtration, the sulphuric acid was got rid of by carbonate of baryta, the filtrate was precipitated by acetate of lead, and evaporated to dryness after the removal of the excess of lead by sulphuretted hydrogen. The residue was once more dissolved in water, and treated with acetate of lead; and in this manner, by repeated evaporation, a small residue was obtained, which only separated traces of protoxide of copper from Fehling's copper test.

The brown mass separated in the decomposition of tannic acid had a great resemblance to that produced from catechuic acid; the author has analysed the latter when dried in the air. The analysis led to the formula $C_{17}\ H_{10}\ O_{10}$; the substance was of a pale cinnamon-brown colour, and lost at 212° F. about three equivalents of water, or 14.4 per cent. Analysis of the air-dried substance:—

C............	53.13	53.13	53.10	17	=	102	53.13
H............	5.21	5.50	5.39	10		10	5.21
O............	41.66	41.37	41.51	10		80	41.66

From these experiments the author draws the following conclusions:—

1. The preparation of perfectly pure tannic acid from catechu is not possible, either by precipitation with sulphuric acid or by extraction with ether, as the catechuic acid contained with it in solution is also precipitated by sulphuric acid, and considerable quantities of this acid are taken up from the catechu by ether.

2. Catechuic acid does not stand in the same relation to the tannic acid of catechu that gallic acid holds to the tannic acid of galls, but probably in an exactly opposite one.

3. The peculiar characters of the different kinds of catechu are probably due only to differences in the mode of preparation.

4. The catechuic acid contained in different kinds of catechu has the same composition, $C_{17}\ H_{12}\ O_{10}$, in which three equivalents are water driven off at 212° F.

5. By long drying at 212° F., catechuic acid is gradually decomposed.

6. Pure catechuic acid, when decomposed by sulphuric acid, furnishes a considerable quantity of a brown insoluble substance, but no sugar.

7. The tannic acid of catechu, similarly treated, also furnishes no sugar.

8. A pure solution of catechuic acid is precipitated by sulphuric acid, and when boiled reduces protoxide of copper from Fehling's copper test.—Liebig's *Annalen*, xcvi., p. 337.

CHEMICAL HISTORY OF THE FATS.

(*Continued from page* 428.)

The question whether that mixture of any two fat acids, which has the lowest melting point, is a chemical compound, must be decidedly negatived; for in such case, it ought in solidifying to assume a crystalline state, in a more marked manner than any other mixture of the same fats. But this is not the case. The mixtures with the lowest melting points are perfectly uncrystalline. Moreover, the proportions of the fat acids in these mixtures are not such as would indicate that they are definite compounds.

When, to a mixture of two fat acids with the lowest melting point, there is added a third fat acid, which has a higher melting point than either of those constituting the mixture, a further reduction of the melting point is effected. Thus, when twenty parts of a mixture of myristic and palmitic acids, whose melting point is 46°.2 C. (115°.2 F.), are mixed with four parts stearic acid, the melting point is reduced to 43°.8 C. (110°.8 F.); and when a mixture of myristic and lauric acids, melting at 35°.1 C. (95°.2 F.), is mixed in the same proportion with palmitic acid, the melting point is reduced to 32°.7 C. (90°.9 F.).

Therefore there can be no doubt that the cause of this phenomenon must be sought, not in the formation of chemical compounds, but in the physical relations of the molecules.

The fat acids are in this respect analogous to the metals, which give alloys that are more fusible than either of those of which the alloy consists; and there are instances in which the introduction of a third metal into such an alloy is attended by a still further reduction of the melting point.

The following fats have been examined by Heintz, according to the method of partial precipitation already described :—

Human Fat.—This consists solely of fat, which by saponification yield glycerine only as the indifferent substance.

The fat acids that it yields are oleic, stearic, and palmitic acids ; therefore the fat itself consists of stearine, palmitine, and oleine, the first of these being in much smaller proportion than palmitine, and the last the most abundant.

Sheep fat likewise contains only glycerine fats, and, like human fat, stearine, palmitine, and oleine. The relative proportions are, however, the reverse of these in human fat : the stearine preponderates over the palmitine, and the amount of oleine is much smaller than in human fat.

Ox fat consists of the same glycerine fats, the relative proportions of stearine and palmitine being intermediate between those in human fat and in sheep fat. The amount of oleine in this fat is much the same as in sheep fat.

Cow butter is a fat that has a more complex composition, as already indicated by the investigations of Chevreul and Lerch. The neutral substance, however, which is separated in saponification, is the same as that yielded by the fats already mentioned. Lerch found that this fat contains four fats which by saponification yield volatile fat acids—butyric, caproic, caprylic, and capric acids—the fats corresponding to these acids being butytine, caproine, capryline, and caprine.

Heintz's examination of the solid fat acids of cow butter has shown that these also are four in number—myristic, palmitic, stearic and butic acid. The latter, however, was obtained in such small amount that it could not be separated in a pure state, although Heintz was able to ascertain that its melting-point is higher than that of stearic acid, and that the carbon in the atom amounts to more than thirty-eight atoms. He considers that this acid has very probably the formula $C_{40} H_{39} O_3 + HO$, and is therefore identical with the acid subsequently obtained by Gössmann,* from the fat of *arachis hypogæa*, and called arachinic acid. Lastly, the oleic acid from cow butter is not a peculiar acid as Bromeis† has stated, but is essentially the same as that obtained from the fats above named.

Spermaceti differs essentially in composition from the above-named animal fats, and in the circumstance that by saponification it does not yield glycerine, but in place of it, a solid substance insoluble in water, and soluble in alcohol. This was discovered by Chevreul, and by him called ethal.

The fat acid combining with the alkali, was called by Smith ethalic acid, and has subsequently been termed cetinic acid. Heintz finds, however, by means of the method of partial precipitation, that it is a mixture of stearic, palmitic, myristic, and lauric acids. So that in spermaceti there must be four neutral fats, compounds of these acids with ethal.

Constitution of Ethal.—Heintz's examination of ethal shows that it is a mixed substance, consisting of several others belonging to the alcohol series. The method by which he arrived at this conclusion, is based upon the following circumstances :—

When substances which in composition are analogous to alcohol are submitted to the influence of hydrated bases at a high temperature, they are converted, like alcohol, into acids which respectively contain as many atoms of carbon as the alcohol from which they are derived. Therefore, if ethal has a composition that corresponds with the formula $C_{32} H_{33} O + HO$, it should, when heated with a mixture of potash and lime, yield either palmitic acid, or an acid having the same composition.

According to Dumas and Stass,‡ an acid is formed in this way that has a composition like that of palmitic acid, but the melting point and physical characters are quite different ; it was regarded by Smith as identical with the acid separated from ethal by saponification of spermaceti. But this has been shown by Heintz to be a mixture of stearic, palmitic, myristic, and lauric acids, and it therefore occurred to him that the acid obtained by Dumas and Stass might probably be a mixture likewise, in which case there would be evidence of ethal being a mixture of the alcohols, corresponding to the acids of which that product consisted in the respective equality of their carbon atoms.

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* *Ann. der Chem. u. Pharm.*, lxxxix. 1.

† Ibid, xlii. 46.

‡ *Ann. der Chem. u. Pharm.*, xxxv. 189.

It may be objected to this mode of reasoning, that the decomposition of ethal under the joint influence of heat and a strong base, would not be limited to the production of the particular acids corresponding to the alcohol, of which it might consist; but that more probably the excess of base would induce a further decomposition of the acid corresponding to the formula $CnHnO_4$, into $Cn_{-4}Hn_{-4}O_4$, with liberation of hydrogen and formation of carbonates. However, Heintz states that this is not the case.

Heintz found that ethal is really converted into a mixture of these four acids, under the above-named conditions, with liberation of hydrogen. These four acids have the formulæ $C_{36}H_{36}O_4$ stearic acid; $C_{32}H_{32}O_4$ palmitic acid; $C_{28}H_{28}O_4$ myristic acid; $C_{24}H_{24}O_4$ lauric acid; hence it follows that ethal consists of the corresponding alcohols. To these alcohols he assigns the following names and formulæ: stethal $C_{36}H_{38}O_2$; ethal $C_{32}H_{34}O_2$; methal $C_{28}H_{30}O_2$; ethal $C_{24}H_{26}O_2$.

The small quantity of glycerine and oleic acid obtained in the saponification of spermaceti are doubtless owing to the presence of foreign admixtures.

(*To be continued.*)

ACTION OF ALUM UPON RED WINES, &c.

Lassaigne has found that the aluminous salts, when dissolved in red wines, are partially decomposed with more or less rapidity, according to the temperature at which the operation is carried on. The result of this reaction is the precipitation of a coloured substance, formed by the union of the alumina with a portion of the colouring matter of the wine. This compound, which varies slightly in colour, according to the kind of wine, is a true lake, such as is produced by alumina with most of the organic colouring principles.

When a red wine is boiled for a few minutes with a very small addition of alum, it gradually becomes turbid, and furnishes a flocculent precipitate, which collects at the bottom of the vessel when the wine is allowed to cool and stand; it forms a completely insoluble lake. This deposit, which may easily be separated by decantation and filtration, presents reactions characteristic of the colour derived from the wine itself; when calcined in contact with the air in a platinum crucible, it leaves a tolerably abundant, white, pulverulent residue, presenting all the characters of anhydrous alumina.

Pure red wines, without any addition of aluminous salt, are not rendered turbid even by long boiling; and besides, the deposit which they may sometimes furnish under these circumstances, would not present the composition above indicated. The author adds, that by this simple process, potash or ammoniacal alum may be quickly detected in wines containing $\frac{1}{1000}$, $\frac{1}{2000}$, or even $\frac{1}{3000}$ of these salts.—*Comptes Rendus*, Feb. 25, 1856, p. 410.

NOTE ON SOME OF THE PRODUCTIONS OF THE RHIO-LINGGA ARCHIPELAGO.*

BY LIEUT. G. F. DE BRUYN KOPS, DUTCH R.N.

Getah Percha.—An exudation from the *Taban* and *Percha* trees. To procure it, the full-grown tree is cut down, when the *getah* flows out. From large trees fifteen to twenty catties may be procured. If more carefully collected, especially by tapping, as with the Caoutchouc and other trees, it might form a permanent branch of trade. The improvident Malay, however, chooses rather to have as much as possible at once, than to enjoy a smaller but more permanent gain. It is for this reason that at the more accessible places on the larger islands, all these trees have already been cut down, and are now only to be met with in the interior, on the east coast of Sumatra, Borneo, and the larger islands. The trade in the product from this Archipelago has already greatly diminished, very little being obtainable. Notwithstanding this falling off, no pains have been taken to plant fresh trees. It is true the stumps of the trees already felled again sprout, but these can only be cut at a distance of thirty years. The *getah* is run into small square pieces, called *tampang*. These are generally twenty to thirty catties in weight; the *getah* is then very dirty, mixed with sand, chips of wood, and other foreign substances, and must therefore be boiled and purified. The colour is light brown mixed with dark and light streaks. All *getah* within the jurisdiction of the Sultan of Lingga must be delivered to him.

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* The appellation *Rhio-Lingga Archipelago*, is applied to two groups of islands, the Rhio group and the Lingga group, lying between Sumatra and Borneo, bounded on the north by the peninsula of Malacca, and on the south by Banca and Billiton. The islands of these groups form a part of the once powerful kingdom of Lingga, which, previous to 1824, extended over a great part of the Malay peninsula and the maritime provinces on the East Coast of Sumatra, from Palembang to the territory of Siac.

DAMMAR.—A resin which exudes spontaneously from different trees, hardens in the air, and falls to the foot of the trees. There are different kinds of it, such as *Dammar batu*, *Dammar kruyong*, *Dammar mata-kuching*, &c. The first kind comes from *Meranti*, *Merawan*, and *Balow* trees; the last, which is clear and transparent, from the *Chengal*. The coarser kinds are pounded into small pieces, rolled up in a piece of *upei*, which is tied together and forms a torch, which is much used for giving light. The finer *Dammar mata-kuching* is used as incense and sent to Java.

WOOD-OIL, or *kruing*, is obtained by cutting a three-sided hole, of one foot high and broad, to the heart of the tree, slightly sloping downwards to the inner side, for the purpose of gathering the oil; it is then burned with torches; the oil is drawn in this direction, and may be taken out of the hole on the sixth or seventh day. This oil is much used for varnishing coarse wood-work, such as sampans, houses, &c.; it is also used for painting, principally green and white, but must be well boiled before it can be used. It is then as good as linseed oil, and much cheaper.

AGAR-AGAR.—A species of sea weed, is found in great abundance on the reefs exposed at low water, especially on Lingga, Sugee and Mooro. It is sold in a dry state, and a picul properly cleaned, is worth from four to four-and-a-half Spanish dollars at Singapore. It is used in the making of sweetmeats, and boiled with sugar into a kind of comfit.

The *Chinchau* is procured from a plant of Chinese origin, which is cultivated on the shore, and is prepared in the same manner as *agar-agar*.

EDIBLE BIRDS' NESTS are found in the rocks and caves at Lingga and are as good as those of Java. The white or best kind are sold for ninety guilders a catty.—*Journ. of the Indian Archipelago and Eastern Asia*, Oct., Nov., Dec., 1854, p. 400.

MEDICINE IN TURKEY.

SERVICE in the Ottoman army, medical or otherwise, offers no inducements whatever to young Americans. Of actual want one suffers little, but must submit to humiliating embarrassment; while the society of even the first officers cannot possibly be agreeable to a person who is cultivated, or accustomed even to the mere decencies of life. The Turks are slow to perceive merit, and still slower to reward it. The first, and almost the only word of English they learn, is *to-morrow;* and, however gentle and urbane the Mussulman may be in private life, he is a paragon of intrigue and overbearing treatment in office. Foreigners who enter the Turkish service appear to adopt permanently their worst peculiarities. It was related to me by an Italian, in the service at Silistria, that Achmet Pasha once caused several of his physicians to be tied up and flogged, in the presence of the troops. We hear much of foreigners in the Ottoman service; but very few of them, surgeons excepted, acquire positions of any importance in the army. Their connexion with the service is nominal, rather than actual.

Mussulmen are averse to surgical operations. Surgery is, in fact, rarely called into requisition in the Turkish camp. During the affair of Kalefat, in which 12,000 Turks perished from cold, fatigue, and sorties against the Russians, and when patient Mussulmen became furious maniacs through extreme suffering, but one grave surgical operation was performed, whereas hundreds of lives might have been saved by judicious management.

Comparatively few Turks practise medicine. The professors of the healing art, in the Orient, are mostly Greek and Italian adventurers, who make the simple Moslems the dupes of their charlatanism. The Imperial licence to practise anywhere in the Sultan's dominions can be obtained for a few piastres. Even those who are employed professionally in the Seraglio, and penetrate the mysterious harems of Turkish grandees, do not hesitate to administer preparations followed by the most fatal effects. They do indeed profess to teach medicine in the schools attached to the mosques, after the doctrines of Avicenna, Averroes, and other Arab authors; but the practice is founded upon no definite system. The believer in fatality does not fear death; and this is the principal reason why, in times of the plague and cholera, the Turks suffer less than the timid Greeks and Armenians.

The most valuable drugs are to be found in the bazaars; but, in consequence of the profound ignorance of the rudiments of chemistry among the Turks, the pharmaceutical preparations sold in the shops are gross and inefficacious. Distilled water is the ordinary medium for administering medicines.

The Mussulmen Hakims divide all diseases into two classes—nervous affections of the face, and those of an erysipelatous character; and, secondly, all maladies not included in the above.

Among the Græco-Slaves, as with the Turks, surgery is monopolised by the knights of the razor. The practice of medicine is confined, for the most part, to magicians and sorcerers. There are no midwives; nature renders them superfluous. The mountaineers have a very efficacious method of treating wounds received in their almost perpetual conflicts. Intermittent fever and dysentery are the prevalent diseases of the climate. As among all uncivilized or half-civilized people, the absence of favourable circumstances causes the premature death of feeble children. Those only who possess vigorous constitutions live to maturity, while their natural strength is increased by a temperate manner of life, especially in mountainous regions. A rapid increase of population is thereby prevented; but those who survive are more healthy and vigorous than the majority in civilized countries. When a person is attacked with any disease, he at once avails himself of the exorcising prayers of his pope or priest, and then drinks largely of cold water. Hydropathy has, in fact, been in vogue for ages with the Græco-Slaves.—*American Medical Monthly.*

THE MEDICINE STAMP.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—In your number for March last, a correspondent adverts to the Medicine Stamp Act. I am not aware whether any such suggestion has ever been offered, but have many times thought that, were the three-halfpenny stamps required on labelled articles liable to duty, divided into three separate stamps of one halfpenny, one penny, for sixpenny and shilling parcels or packets, and three-halfpenny on eighteen-penny ones, it would bring no inconsiderable increase to the revenue, and at the same time, as your correspondent justly observes, benefit the poor, who can only have small quantities either of food or physic at a time, and secure the retail vendor from doubt and alarm in what they do sell. J.

June 17*th*, 1856.

PHARMACY IN THE CRIMEA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—I cannot, in justice to myself and the body of Dispensers generally, pass over in silence the remarks put forth in the article headed "Latest from the Crimea," contained in the Journal for June. The writer states "not one Dispenser left these shores without a fair prospect of distinction;" that "they have little realized the dignity of their position;" that "the crown is missing, though the struggle is ended." Allow me to state that the "distinction," "dignity," and "crown" have proved to those who left England with a strong faith in their reality mere *ignes fatuæ*. The only possible prospect of distinction was that of being appointed Apothecary (a term not to be confounded with that of a Member of the Apothecaries' Hall), the duties being simply to receive and distribute the various medical stores. One of the earlier Dispensers, in consequence of the illness and subsequent removal of the Apothecary, fulfilled the whole of these duties at the General Hospital, Scutari. He still remains a Dispenser, not even having the indulgence customary in the army of drawing pay in proportion for the duty performed. Again, a new appointment, "Assistant Storekeepers," was made, and clerks from wholesale houses were sent out at a fixed rate of pay, more remunerative than that of a Dispenser, consequently superseding the necessity of appointing Apothecaries (the reason, I presume, being that an Apothecary is a commissioned officer, and could not be discharged upon the conclusion of the war).

Thus discouraged and stripped of their anticipations of success and advancement, what inducement has there been for Dispensers to publish their experiences, resulting as they have done in disappointment, especially as all do not possess the same eloquence and desire to appear in print as the writer of the article in question? Nevertheless, one communication on a botanical subject, from a Dispenser, has appeared in your Journal, showing that observation is not altogether wanting in the corps. Another (who, unfortunately, has fallen a victim to the climate) had got together a numerous and well-arranged collection of entomological specimens, since transmitted to his friends.

As regards the "dignity" to be realized, there was about the same amount as usually invests a "nursery governess," admitted on sufferance to the drawing-room, and with ideas too refined to find companionship in the kitchen. So were we slighted by officers, and our inclinations not leading us for society in the lower grades, I found in my own case eight months sufficient to dissipate all visionary ideas, &c., so resigned my appointment. Many more have only been restrained from so doing by expediency and pecuniary considerations.

I am, Sir, your obedient Servant,

HENRY THOMAS WAITE.

Late Dispenser of Medicines.

11, *Victoria Road, Pimlico,*
June 14*th*, 1856.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—Seeing an article in your Journal for last month, headed "Latest from the Crimea," I read it, expecting to hear something connected with my former associates, I was, however, disappointed, as it proved to be only the latest from "Southampton Street," a communication so incomprehensive in its purport, that I should like to know whether there is any meaning attached to it, or is it simply an attempt at authorship? One question presents itself very forcibly, how was it that a person so deeply impressed as the writer, with "the prospect of distinction in the noblest pathway to success," did not seize upon "an opportunity never to return," to exchange the "weary monotony of working from early dawn to late at night," for "the welcome stimulus of a liberal salary and the martial uniform." If the writer can attach much "dignity" to an anomalous rank regarded by many as being unnecessary, I think he would find that experience would teach a somewhat bitter lesson. His phrase, "The race is run, but we miss the crown," is quite mysterious; to my knowledge, nothing has ever been offered to stimulate the Dispensers to commence the "struggle." Amongst themselves there was no higher grade than that of seniority of service, promotion beyond this having taken place but twice since the war commenced, one case being that of a gentleman of mature age, long attached to the army; and the other, that of one who held the heavy responsibility of the Balaklava stores since their commencement; plainly showing that we were a body intended for service only as long as Government was compelled to employ us. As to writing letters on Pharmacy, there was but little to disclose. We certainly could judge whether diarrhœa or fever prevailed, yet, as we rarely had an opportunity of watching the treatment and progress of the patients, it would have been a difficult matter to communicate anything interesting. If the writer recommends botanizing with the thermometer at 95° in the shade, I am afraid he would get few but enthusiasts to agree with him. Regarding private letters, it must be very gratifying to the senders, to know how their deficiencies have been publicly commented on; and it is equally so to others to find a whole body judged by one man's set of friends. I know many Dispensers, qualified by their connexion with the Pharmaceutical Society, who resigned first-class situations in London to enter a service only to be disappointed, and who, if they had possessed the ambition to display their abilities in writing articles when they had nothing to communicate, would probably have astonished the readers of the *Pharmaceutical Journal* as much as the writer in question has done me.

I am, Sir, yours obediently,

G. H. SMEETON,

Late Army Dispenser of Medicines.

Bloomsbury Square, June 17*th*, 1856.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL

SIR,—The remarks contained in the *Pharmaceutical Journal* for June, in Mr. Ince's letter, demand reply.

Mr. Ince is evidently visionary and imaginative to an extraordinary degree connected with the subject on which he has expended his eloquence in detracting from the merits of individuals engaged as Dispensers of Medicine to the army.

In answer to the query, "Why have young men not written to the Journal describing the state of Pharmacy at Kululi, Scutari, and Smyrna, for the benefit of their friends at home?" I reply, that "correspondents" to public journals are looked on in the service with great suspicion, more particularly by those in authority at home than abroad. I firmly believe that any one so indiscreet as to have written publicly, stating our supply of drugs, issues, and deficiency, would have been weeded out of the service on the first opportunity that offered.

Independent of one voluntarily placing himself in such an invidious position, a little reflection will convince you that no one can describe that which does not exist. Certainly, we might have enlightened our friends at home, by stating that we received consignments from England of tinctures in 2lb. glass bottles, and that lint and surgical appliances also were consigned, packed in large cases! As to practice of physic, the rules of the service do not admit of our interference with the action of medicines. We are simply *compounders* of the medicines prescribed, and issuers of drugs. It would not be judicious to go out of our province, for fear of exciting the jealousy of other branches of the service. Doubtless any individual that courted the notoriety attached to appearing in print, might have drawn an interesting sketch on frost-bites, fever, cholera, dysentery, &c., but all this without the *usual embellishment* (which Mr. Ince is thoroughly proficient in) would have been commonplace and uninteresting. In allusion to the visionary path by which "not one of us but what had a fair prospect of advancement," all I can remark is, I should have been delighted if Mr. Ince had joined our body—then experience would have dispelled the romance of his illusion.

Mr. Ince has thought proper to attach a *public* disgrace on that which is acknowledged to have been *private*. It does not shew good taste or kind feeling thus to wound the sympathies of a body; and, to do so, to take advantage of a *private* letter deficient in orthography and lacking the power of description, not only is a breach of confidence to the individual concerned, but a public insult to the community at large. Soliciting the favour of the insertion of the above, on behalf of my brethren serving in the East, who will not, for some period, have an opportunity to defend themselves,

I have the honour to be, Sir, yours obediently.

JOHN W. N. BREWER,

Associate Pharmaceutical Society, and Dispenser of Medicine, Army Medical Staff.

London, June 24th, 1856.

[Mr. Ince's letter has elicited some information on Pharmacy in the Crimea, which may serve to explain partially the dearth of previous communications on the subject. We had previously entertained a belief that the arrangements were either remarkably good or remarkably bad, or something between good and bad, and capable of improvement. In each of these cases, it would have been interesting to know the facts. Whether the hospitals in the Crimea or elsewhere were models of perfection or the reverse, whatever might have been their peculiarities in arrangement, management, position, or in other respects, there was, we supposed, a wide field for observation and graphic description, an opportunity which might have been acceptable to young men interested in their profession, and capable of giving their ideas a tangible form. The communications hitherto received are few and far between, and contain but little information. This is accounted for by Mr. Brewer, who states that any description of the proceedings would have caused the author to be weeded out of the service. Under these circumstance, we cannot presume to fix the boundary line between prudent discretion and a breach of confidence.

RAFFLE FOR A BUSINESS.

The following curiosity has been received from a correspondent:—

THE VALUE OF £100 FOR 10*s*.

To be disposed of by raffle, at Whiteman's New Brunswick Hotel, Clayton Square, on Monday evening, June 23rd, 1856, a first-rate Druggist's Shop, doing a good business, in a respectable neighbourhood, comprising mahogany drawers, with glass nobs, mahogany top counter, glass cases, upright and flat, scales and weights, show globes, mortars and pestles, labelled bottles and jars, oil-cloth and matting; with well selected stock of drugs, perfumery, &c.; the shop having a plate glass front, with a good house attached, at a moderate rent; and fitted up with gas, and Venetian blinds throughout the house. Tickets to be had at the following wholesale Druggists:—Clay, Dod, and Case, St. Anne Street; Sharp, Higgin, and Cattle, Seel Street; Sumners and Co., Lord Street; at Whiteman's New Brunswick Hotel, Clayton Square; or on the premises, 211, Chatsworth Street, top of Upper Parliament Street, Liverpool.

BOOKS RECEIVED.

A Manual of Photographic Chemistry; including the Practice of the Collodion Process. By T. F. Hardwich, late Demonstrator of Chemistry in King's College, London. Third Edition. London: John Churchill, New Burlington Street, 1856. (From the Author.)

Third Report of the Commissioners for the Exhibition of 1851, to the Rt. Hon. Sir George Grey, Bart., &c., &c. London: Printed by George E. Eyre and William Spottiswoode. (From Her Majesty's Commissioners.)

Proceedings of the American Pharmaceutical Association at the Fourth Annual Meeting. New York. 1855.

TO CORRESPONDENTS.

Mr. Harris (Plymouth) has sent us a description of a Chlorine Fumigator, which, however, is not new. An apparatus, exactly similar in principle, was invented by Mr. Smith several years since, a description of which was published in this Journal, vol. vii., page 263.

M. P. S.—Silver Plate Licence. There has been no alteration in the law respecting the sale of silver articles since the notice in this Journal, vol. xiii., page 200.

J. S.—No.

W. (Liverpool).—*Liquor Cotyledon: Umbilicis.* There is no published formula, but a preparation is advertised under the above name, by Mr. Davenport, of Great Russell Street.

J. A. (Commercial Road).—*Artificial Fruit Essences* are not applicable for making syrups.

J. C. (Wandsworth).—*Coral Tooth Paste.* Prepared coral 5 oz., cream tartar 3 oz., cuttle-fish bone 3 oz., cochineal ½ drachm, Narbonne honey 16 oz.—*Desforges.*

J. A. B. (Tipton).—*Taylor on Poisons.*

Galer (Manchester).—*Tests for Strychnine.* See page 23.

R. H.—There is evidently an error in the figures.

J. Mackay (Edinburgh), *J. Tuff* (Enfield), *A Member* (Clerkenwell).—The specimens of quackery have been received, and will be noticed in a future number.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd) to Mr. Churchill, New Burlington Street. Other communications to the Editor, 15, Langham Place.

LIST
OF THE
MEMBERS, ASSOCIATES, AND APPRENTICES
OF
The Pharmaceutical Society of Great Britain.

1856.

MEMBERS OF THE COUNCIL.

PRESIDENT.

Jacob Bell, 338, Oxford Street.

VICE-PRESIDENT.

William Lionel Bird, 42, Castle Street, Oxford Street.

TREASURER.

Daniel Bell Hanbury, Plough Court, Lombard Street.

Brew, Thomas A.	71, East Street, Brighton
Bucklee, William Henry	86, New Bond Street
Davenport, John Thistlewood	33, Great Russell Street, Bloomsbury
Deane, Henry	Clapham
Edwards, George	Dartford
Edwards, John B.	42, Berry Street, Liverpool
Gifford, Joseph	3, Gloucester Place, Camberwell New Road
Herring, Thomas	40, Aldersgate Street
Keeling, George R.	High Street, Epsom
Lea, John Wheeley	68, Broad Street, Worcester
Macfarlane, John F.	17, Northbridge, Edinburgh
Morson Thomas, N. R.	Queen's Square, Bloomsbury
Palmer, Robert	33, Wilton Place, Belgrave Square
Smeeton, Edward	Commercial Street, Leeds
Smith, Nathaniel	High Street, Cheltenham
Squire, Peter	277, Oxford Street
Waugh, George	177, Regent Street
Woolley, James	69, Market Street, Manchester

SECRETARY AND REGISTRAR.

George Walter Smith, 17, Bloomsbury Square.

HONORARY MEMBERS.

Aberdeen	Thomas Clark, M.D.
Africa	William F. Daniel, M.D., F.G.S., F.L.S.
Athens	Xavier Landerer, M.D.
Berlin	C. G. Mitscherlich, M.D.
	Heinrich Rose
Brighton	Edward Gustavus Schweitzer
Bristol	William Herapath
Calcutta	W. B. O'Shaughnessy
Ceylon	G. H. K. Thwaites
Christiania	Frederick Holst
Coblentz	Friedrich Mohr
Edinburgh	Robert Christison, M.D., F.R.S.E.
	Douglas Maclagan, M.D., F.R.S.E
	George Wilson, M.D., F.R.S.E.
Erlangen	Theodor W. C. Martius
Geneva	Dr. Coindet
Hesse Cassel	Eduard Martiny
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	Frederic John Farre, M.D.
	Alfred Baring Garrod, M.D.
	Thomas Graham, M.D., F.R.S.
	A. W. Hofmann, Ph.D.
	John Lindley, Ph. D., F.R.S., F.L.S,
	William Allen Miller, M.D., F.R.S.
	John Ayrton Paris, M.D., F.R.S.
	George Owen Rees, M.D., F.R.S.
	D. B. Reid, M.D., F.R.S.E.
	John Forbes Royle, M.D., F.R.S., F.L.S.
	John Stenhouse, LL.D., F.R.S.
	Alfred Swaine Taylor, M.D., F.R.S.
	Andrew Ure, M.D., F.R.S.
	Alexander Ure, M.D., A.M., F.R.C.S.
Madras	Hugh F. C. Cleghorn, M.D.
Munich	Carl Frederick Philip Von Martius, M.D.
	Justus Liebig, M.D., F.R.S.
Paris	Felix Boudet, Membre de l'Académie de Médecine
	Cap, Correspondant de l'Académie de Médecine
	Dorvault, Directeur de la Pharmacie Centrale des Pharmaciens
	Guibourt, Membre de l'Académie de Médecine, Professeur à l'Ecole de Pharmacie.
	Mialhe, Agrége Libre de la Faculté de Médecine Pharmacien à l'Empereur
	Pelouze, Membre de l'Académie des Sciences
	Soubeiran, Membre de l'Académie de Médecine, Professeur à la Faculté
	Weddell, Docteur en Médecine, Membre de la Societé Philomatique
Philadelphia	Robert Hare, M.D.
	William Proctor, Jun.,
	George B. Wood, M.D.
Rotterdam	John Elishee De Vry
Strasburg	Charles Gerhardt
Stockholm	N. P. Hamberg, M.D.
St. Domingo	Sir Robert H. Schomburgh

FOREIGN LIFE MEMBERS.

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1851		Alexander, James Lyon	Sydney
1854	48	Archer, William	Geelong
1848	34	Baeër, Gustave E.	Strasburg
1855	401	Baissac, Pierre Joseph	Mauritius
1852	167	Baschet, George Constant	Mauritius
1849		Baylis, William	Launceston, Tasmania
1852		Bishop, William	Wellington, N. Zealand
1852		Carpenter, Henry	Demerara
1854	347	Dru, Casimir Theodore A.	Mauritius
1850	74	Fleurot, Emile	Mauritius
1855	389	Francis, Henry	Melbourne
1853		Guiot, Jean Felix E.	Mauritius
1850	82	Lamusse, Louis A.	Mauritius
1847		Lediard, Charles	St. Vincent
1847	28	Mailloux, Joseph	Mauritius
1851	93	Mailloux, Auguste	Mauritius
1847	19	Nobrega, Gerardo Jose da	Madeira
1855	407	Noël, Ferdinand	Mauritius
1852	118	Regnaud, Charles	Mauritius
1850		Roberts, Henry	Florence
1852		Roberts, Thomas H.	Gibraltar
1843		Rogers, Henry	Bombay
1852	72	Sinimberghi, Nicholas	Rome
1844	1	Sparks, John	Bombay
1844		Stewart, F. H.	Demerara
1853		Whitburn, Augustus R.	Rome

The figures in the second column correspond with the number of the Certificate of Examination.

* Life Members.

LONDON MEMBERS.

Year of Admission.	No. of Certificate.	NAME.	ADDRESS.
1841		Allan, David	100, Freeschool Street
1850	70	Allchin, Alfred	Cole's Terrace, Islington
1841		Allen, William	2, Morgan's Place
1853		Ambrose, John	1, Union Place, Commercial Road
1844		*Ambrose, Thomas	86, High Street, Whitechapel
1842		Anderson, Charles	23, Lower Belgrave Place
1842		Appleton, Thomas Cass	45, Curzon Street
1841		Ashton, William	154, Sloane Street
1853		Attwood, Alfred	61, Cannon Street
1841		Austin, Henry	151, Bermondsey Street
1853		Bailey, Delamore J.	30, Conduit Street
1841		Baiss, William A.	102, Leadenhall Street
1841		Baiss, James	102, Leadenhall Street
1841		Baker, William J.	21, Brecknock Place, Camden Tow
1845		Ball, Thomas M.	27, St. George's Road
1841		Balmer, John	94, St. John Street Road
1841		Barber, Thomas A.	2, Scott's Place, Islington
1842		Barber, Joseph	7, Orange Street
1848		Barnard, John	1, Oxford Terrace, Clapham Road
1853		Barnes, James B.	Trevor Street, Knightsbridge
1841		Barry, John T.	Plough Court
1841		Bartlett, William	1, Brettin Terrace, Chelsea
1842		Bass, William F.	Gray's Inn, " 3, Raymond Building
1844		Bastick, William	2, Brook Street
1841		Bayley, Edmund	26, Leadenhall Street
1851		Beaton, John	174, Shoreditch
1853		Becket, William E.	6, Giltspur Street
1841		Bell, Jacob	338, Oxford Street
1853	17	*Bell, William Henderson	48, Albany Street, Regent's Park
1842		Bentley, William	11, Mount Street, Bethnal Green
1841		Best, John D.	26, Suffolk Street, Pall Mall
1855	270	Biggs, Walter	19, Notting Hill Terrace
1842		Binge, Thomas	78, York Street, Westminster
1842		Binnington, Stephen	35, Haymarket
1841		Bird, William L.	42, Castle Street East
1850	57	Bird, Augustus	22, High Street, Kensington
1843		Blake, Charles T.	47, Piccadilly
1842		Bland, John J.	57, Penton Street, Pentonville
1841		Blandford, John F.	9, Bruton Street
1853		Bolton, William	146, Holborn Bars
1842		Bond, Henry	11, Cross Street, City Road
1853		Boothby, Henry Neal	72, Crawford Street
1842		Boully, Peter	Queen's Road, Bayswater
1849		Bourdas, Isaiah	10, Pont Street, Belgrave Square
1842		Bowden, Edward	13, Charles Street, St. James's
1852		Bower, William	96, Tottenham Court Road
1842		Bradley, John	10, Pont Street, Belgrave Square
1847		Brewer, Eli	43, Duke Street, Manchester Squar
1845		Brooks, Charles	Southwell
1853	190	Bromley, Richard M.	Denmark Hill
1853		Brotherton, William H.	1, Clyde Terrace, Caledonian Road

Year of Admission.	No. of Certificate.	NAME.	ADDRESS.
1842		Brown, James	27, Aldgate
1842		Buck, Thomas	Kingsland Green
1842		Buckle, Christopher P.	Gray's Inn Road
1846		Bucklee, William H.	86, New Bond Street
1847		Bufton, Edward	122, Piccadilly
1845		*Burden, Edward	38, Duke Street, Grosvenor Square
1846		Burden, Thomas	6, Store Street, Bedford Square
1853		Burgoyne, James	31, Throgmorton Street
1855		Carr, John	171, High Holborn
1853		Carrick, James	46, Churton Street, Pimlico
1853		Carty, John	172, New Bond Street
1853		Cattell, George	Homerton
1842		Chapman, John	7, High Street, Islington
1853		Chard, Frederick J.	13, Eccleston Street South
1847		Charsley, Nathaniel	Brixton
1853		Chubb, James C.	59, St. John Street
1845		Clarke, Benjamin	Mare Street, Hackney
1841		Cobb, Robert C.	10, Frederick Place, Hampstead Road
1853		*Cockrill, James	2, Wellington Street, Waterloo Town
1849		Cocksedge, Henry B.	16, Cullum Street
1852		Colchester, William M.	2, Crown Street, Hoxton
1849		Cole, William H.	16, George Street, City
1842		Coles, John	New Road, Camberwell
1854	191	Coles, Charles	72, Euston Square
1845		Collins, John R.	Haverstock Hill
1853		Collins, Robert N.	Oxford Court, Cannon Street
1841		Compton, Charles	14, Brewer Street, Golden Square
1841		Constance, William	5, Hanover Place, Regent's Park
1848		Constance, Edward	37, Leadenhall Street
1853		Cooke, John	63, High Street, Hoxton
1848		Cooper, William T.	26, Oxford Street
1853		Cooper, Robert H.	20, Royal Exchange
1847		Corfield, Daniel	22, Thrawl Street, Spitalfields
1853		Cornelius, Joseph	Clapham
1851		Couch, William O.	8, Theberton Street, Gibson Square
1848		Cowdery, George T.	36, Paternoster Row
1845		Cracknell, Charles	107, Edgware Road
1853		Cripps, John	Hammersmith
1853		Cross, Henry	4, Shepperton's Pl., New North Rd.
1841		Croucher, John T.	223, High Street, Shadwell
1853		Croyden, Charles	37, Wigmore Street
1842		Cullen, William	37, Beckford Row, Walworth
1852		Curtis, Frederick	15, Crawford Street
1841		Dakin, Thomas	73, King William Street, City
1842		Dakin, Joseph	248, High Street, Poplar
1853		Darby, Stephen	140, Leadenhall Street
1842		Davenport, John T.	33, Great Russell Street, Bloomsbury
1841		Davies, Charles	11, Claremont Place, North Brixton
1845		Davies, Henry E.	43, Wood Street, City
1841		*Davy, Charles	100, Upper Thames Street
1841		Deane, Henry	Clapham
1850		Dickinson, William	16, Cambridge Street, Edgware Road
1842		Doughty, Edward William	4, William Street, Knightsbridge
1841		Down, John	7, Coburg Place, Bayswater

Year of Admission.	No. of Certificate.	NAME.	ADDRESS.
1841		Drew, James	Bush Lane, Cannon Street
1847		Eardley, John	14, Charles St., Westbourne Terr
1841		Eddy, Charles W.	30, Crown Street, Finsbury
1853		Edwards, William S.	14, Eltham Place, Old Kent Road
1853		Elkington, Edward	56, Grange Road, Bermondsey
1849		Ellis, George H.	4, Pavement, Finsbury
1853		Ellis, Scrivener W.	36, Lower Marsh, Lambeth
1853		Elvey, Thomas	8, Halkin Street, West
1841		Evans, John	60, Bartholomew Close
1851		Evans, John H.	60, Bartholomew Close
1841		Farmar, Robert A.	40, Westminster Road
1841		Faulconer, Robert H.	Keen's Row, Walworth
1853		Fells, John	Stockwell
1853		Fenn, John F.	16, Regent Street, Westminster
1841		Field, William	27, Queen's Buildings, Brompton
1842		Fincham, Robert	57, Baker Street
1847		Fincham, Zacariah C.	57, Baker Street
1841		Fisher, William H.	18, Conduit Street, Bond Street
1832		Foulger, Samuel	133, St. George's Street, East
1841		Fowler, Richard	14, Brewer Street, Golden Squa
1841		Fox, William	48, Church Street, Bethnal Gree
1856		Francis, George B.	2, High Street, Islington
1841		Freeman, John	13, Blackfriars Road
1853		Freeman, Richard	5, Clayton Place, Kennington Ro
1843		*Freeman, Robert	38, High Street, Kensington
1853		French, William A.	309, High Holborn
1853		Gadd, Charles	1, New Bridge Street, Vauxhall
1842		Gale, Henry	3, Millbrook Street, Camden To
1854	78	Gale, Samuel	338, Oxford Street
1841		Galliers, George	Tottenham Court Road
1841		Garden, Alexander	372, Oxford Street
1843		Garden, Felix R.	372, Oxford Street
1841		Garle, John	12, Kensington Terrace
1850		*Gerard, Philip Augustus	390, Strand
1848	30	Gibbs, Nathaniel B.	1, St. John's Wood Terrace
1841		Gifford, Joseph	3, Gloucester Place, Camberwell
1848		Gigner, John	King's Road, Chelsea
1843		Gill, George W.	15, Crown Place, Walworth
1842		Glover, George	19, Goodge Street
1841		*Gloyne, Charles	3, Kensington Terrace
1842		Goddard, John D.	6, Arthur Street, City
1853		Golding, William	42, Upper Albany Street
1842		Goodbarne, Thomas	13, Charles Place, Charles Squa
1842		Goodbarne, Thomas R.	Hornsey Road
1853		Goode, Thomas	47, Minories
1847		Goodger, David	30, Regent Street
1853		Goosey, William	5, Ocean Row, Stepney
1853		Gorton, John G.	144, High Street, Whitechapel
1854		Gosden, Henry	140, Leadenhall Street
1847		Greenish, Thomas	20, New Street, Dorset Square
1842		Griffiths, John	Clerkenwell Green
1841		Grindle, George	122, Pall Mall
1847		Grindle John	104, High Street, Borough

Year of Admission.	No. of Certificate.	NAME.	ADDRESS.
1853		Grisdale, John M.	216, Tottenham Court Road
1853		Gristock, Thomas	42, South Street, Manchester Square
1851		Gulliver, William	33, Lower Belgrave Street
1841		Gunton, Walter G. B.	6, New Weston Street, Southwark
1856		Guy, George H.	63, Great Russell Street, Bloomsbury
1853		Hackman, Leonard L.	24, Union Street, Bishopsgate Street
1853		Haine, John	Allen Road, Stoke Newington
1853	182	Hains, Parton John	28, Upper Albany Street
1841		Hanbury, Cornelius	Plough Court
1841		*Hanbury, Daniel Bell	Plough Court
1846		Harding, John T.	4, Cheapside
1851		Hargood, William R.	28, Sidney Place, Commercial Road
1852		Harvey, Edward	6, Giltspur Street
1855		Haselden, Adolphus F.	18, Conduit Street
1843		Hemingway, Walter	20, Portman Street
1853		Henly, John C.	213, Upper Thames Street
1841		Henson, Matthew	Camberwell Green
1853		Henty, Henry M.	87, High Street, St. John's Wood
1841		Herring, Thomas	40, Aldersgate Street
1841		Herring, William	40, Aldersgate Street
1841		Herring, Edward	Trinity Square, Southwark
1843		Hewitt, John	1, Wellclose Street, Wellclose Square
1842		Hewlett, Charles J.	6, Arthur Street, City
1842		Hibon, John	12, Down Street, Piccadilly
1852		Hickley, Thomas P.	125, Edgware Road
1853		Hilgenberg, Henry	38, Houndsditch
1842		Hill, Arthur S.	11, Little Britain
1853		Hill, Arthur B.	11, Little Britain
1848		Hills, Thomas H.	338, Oxford Street
1852		Hockin, John B.	38, Duke Street, Manchester Square
1852		Hogg, Robert	9, Albion Place, Hyde Park Square
1853		Holland, William F.	9, Compton Street
1841		Hooper, William	24, Great Russell St., Covent Garden
1842		Hooper, William	7, Pall Mall East
1841		Hooper, Bartlett	43, King William Street, City
1841		Hooper, Hugh H.	22, Commerce Place, Brixton
1853		Hopkin, William K.	5, New Cavendish Street
1849		Hopkins, Thomas	16, Newgate Street
1851		Hopkins, Thomas B.	Tulse Hill
1853		Hora, Henry W.	58, Minories
1853	175	Horncastle, John	12, Stanhope Terrace
1841		Horner, Edward	20, Bucklersbury
1841		Horner, James T.	20, Bucklersbury
1853		House, David W.	177, St. George's Street, East
1856	412	Howell, Maurice	Peckham
1856	435	Howell, Thomas	61, Gray's Inn Road
1842		Hucklebridge, James M.	103, Upper Ebury Street
1841		Hudson, William B.	27, Haymarket
1843		Hughes, William P.	170, Hoxton Old Town
1853		Hugill, John	61, Cannon Street
1853		Hulse, Richard	10, Moreton Terrace, Kentish Town
1842		Humpage, Benjamin	51, Judd Street
1842		Hunt, Henry	1, St. George's Terrace, Gibson Sq.

Year of Admission.	No. of Certificate.	NAME.	ADDRESS.
1855	104	*Hunt, Richard	Brixton
1853	198	Hunt, William	Camberwell Green
1842		Huskisson, John	12, Swinton Street
1853		Huskisson, Henry O.	77, Swinton Street
1841		*Huskisson, William	12, Swinton Street
1848		Huxtable, John	104, St. John Street
1848		Huxtable, William	104, St. John Street
1853		Ingram, Robert	2, Queen's Terrace, St. John's Woc
1841		Jackson, John	47, Southampton Row
1853		Jamieson, John	49, Davies Street, Berkley Square
1855	298	Jefferson, Ebenezer W.	Stoke Newington
1845		Jeynes, George W.	42, Princess Street, Edgware Road
1845		Jeynes, Edward	49, Great James Street, Lisson Gro
1853		Jobson, Thomas C.	4, John's Row, St. Luke's
1853		Jolley, George	13, Curzon Street, Mayfair
1842		Jones, Peter	11, Norton Folgate
1842		Jones, William	34, Tavistock Place, Tavistock Squa
1849		Jones, Henry S.	Fulham Road
1841		Keating, Thomas	79, St. Paul's Churchyard
1842		Kemp, Robert	2, Queen's Place, Holloway
1842		Kemp, Richard	Upper Street, Islington
1841		Kent, Thomas	226, Blackfriars Road
1848		*Kernot, George	2, Chrisp Street, Poplar
1853		Kettle, Joseph	42, Castle Street East
1853		Kibler, Richard C.	3, Goldsmith Row, Hackney
1853		King, Robert	21, Princes Street, Hanover Squar
1853		King, Charles T.	86, Snow Hill
1855	309	Kingdon, William Y.	6, Devonshire Terrace, Notting Hil
1853		Knowles, William	Camden Town
1853		Lacy, Benjamin W.	63, Lupus Street
1842		*Langton, Frederick C.R.	226, Upper Thames Street
1850		Large, John H.	2, Holt's Place, New North Road
1853		Laugher, Charles H.	Camden Town
1853		Lavers, Richard H.	28, Old Street Road
1856		Lawrence, Frederick	8, New Chapel Street, Kentish T
1841		Lescher, Joseph S.	60, Bartholomew Close
1853		Lidwell, Joshua A.	46, High Street, Notting Hill
1853	260	Long, George	114, High Holborn
1853		Lovell, Frederick G.	10, Staverton Row, Walworth
1853		Lowe, William E.	8, Stafford Street, Bond Street
1841		*Luckombe, Charles	86, Snow Hill
1841		*Macmurdo, Edward	100, Upper Thames Street
1842		McCullock, William	95, Bishopsgate Street
1849		McCullock, Charles	Covent Garden.
1853		McDougall, William	174, Regent Street
1845		McLacklan, James	42, Whitechapel Road
1849		Maitland, Alexander	8, Torrington Place, Torrington S
1841		Maitland, John	10, Chester Place, Hyde Park
1853		Mansell, William	Plough Court
1853		Marris, Joseph	37, Berners Street
1853		Marshall Thomas	2, Clayland's Place, Clapham Roa
1853		Mason, John W.	45, Upper Marylebone Street
1853		Matland, George	10, Nassau Place, Commercial Ro

Year of Admission.	No. of Certificate.	NAME.	ADDRESS.
1842		May, John	Battersea
1842		Meggeson, George	61, Cannon Street
1853		Merrell, James	1, Queen's Terrace, Camden Villas
1855		Mitchell, John	12, Well's Row, Islington
1850		Moody, Henry	5, Waterloo Terrace, Regent's Park
1842		Moody, James	24, Church Street, Camberwell
1846		Moore, James L.	1, Craven Street, Westbourne Terrace
1853		Morson, Thomas	19, Southampton Row
1841		*Morson, Thomas N. R.	Queen Square, Bloomsbury
1841		Moscrop, Edward H.	144, Strand
1853		Mould, Samuel	21, Moorgate Street
1855		Mumford, George	5, Bathurst Street, Hyde Park
1853		Nicholls, John	3, Celbridge, Pl., Westbourne Terrace
1853		Northway, John	27, Great Tower Street
1842	218	Oakley, George W.	35, Lamb Street, Spitalfields
1853		Ogle, William H.	Battersea
1855		Oldfield, Henry	3, Radcliff Terrace, Goswell Road
1841		Orridge, Benjamin B.	30, Bucklersbury
1853		Palmer, Robert	33, Wilton Place, Belgrave Square
1853		*Parnell, George William	3, Artichoke Place, Mile End Road
1842		Parsons, Robert	98, York Street, Westminster
1842		Pasmore, James	5, Colville Terrace, Pimlico
1853		Pattison, George	126, St. John Street Road
1853		Peacock, Hamerton R.	170, High Street, Poplar
1841		Pedler, George S.	199, Fleet Street
1852		*Penrose, Arthur Wellesley	7, Amwell Street, Clerkenwell
1853		Pepper, John	1, Bedford Street, Bedford Square
1843		Peppin, Sydenham H.	25, Princes Street, Leicester Square
1854		Phillips, John	3, Vernon Place, Bagnigge Wells Rd.
1852		Phillipson, Edward B.	116, Tottenham Court Road
1842		Philpot, Henry	32, Praed Street, Paddington
1843		Plummer, George	High Street, Peckham
1841		Pollock, Thomas	129, Fenchurch Street
1841		Portello, William	41, Stanley Street, Pimlico
1842		Potts, Robert U.	55, South Audley Street
1853		Power, John H.	Denmark Hill
1842		Preston, Joseph T.	94, Smithfield Bars
1852		Preston, Stanton W.	94, Smithfield Bars
1855	68	Quiller, Charles R.	15, Sloane Square
1841		Rea, Edward	115, Wardour Street
1853		Readman, Henry	18, Mortimer Street, Cavendish Sq.
1841		Redwood, Theophilus	19, Montague Street, Russell Square
1854		Richards, James	1, Chichester St., Westbourne Terrace
1845		Richardson, George	12, Norland Terrace, Notting Hill
1848		Ridsdale, James	Wakefield Terrace, Caledonian Road
1843		Roach, Pope	8, St. James's Street
1841		Rouse, Benjamin R. C.	9, Wellington Street, Southwark
1842		Rouse, Frederick J.	Clapham
1841		Rouse, Robert	1, Wigmore Street
1841		Rowland, Christopher	260, Tottenham Court Road
1848	84	Russell, Charles J. L.	13, Baker Street, Portman Square
1848		Sadler, William	13, Norton Folgate
1841		Sainsbury, Samuel	177, Strand

Year of Admission.	No. of Certificate.	NAME.	ADDRESS.
1853		Sandford, George W	47, Piccadilly
1853		Saxeby, William S.	11, Tothill Street, Westminster
1843		Schacht, William	38, Houndsditch
1843		*Sharpe, George Young	6, Kensington Terrace
1842		Sharwood, James W.	55, Bishopsgate Street Without
1852		Simmonds, Joseph	38, Lambeth Walk
1851	89	Sims, John F.	8, Hemingford Place, Barnsbury
1854		Skidmore, John	3, Charles St. West, Westbourne
1842		Slipper, James	86, Leather Lane
1847		Smith, William F.	12, Keen's Row, Walworth
1854		Snell, Glanville A.	3, Hampton Terrace, Hampstead
1841		Snowdon, George W.	79, Basinghall Street
1842		Southwood, Thomas S.	Harrow Road
1841		*Squire, Peter	277, Oxford Street
1841		Squire, William	95, Bishopsgate Street
1841		Starkie, James	4, Strand
1849		Stead, John M.	213, Upper Thames Street
1852		Steer, Philip R.	Clapton
1853		Stevens, George J.	11, Gower Street North
1854	97	Stocken, James	112, Drummond Street, Euston S
1849		Stone, Thomas W.	235, Oxford Street
1850		Stuart, John E.	172, Bond Street
1853		Summers, James R.	43, Curtain Road
1841		Swire, Roger	14, Edgware Road
1854		Taylor, John	77, Hackney Road
1853		Thomas, Henry	7, Upper St. Martin's Lane
1851		Thomas, Richard W.	10, Pall Mall
1855		Thomas, John J.	West Hackney
1845		Thompson, Henry A.	86, Chiswell Street
1841		Tonge, George	213, Upper Thames Street
1842		Towerzey, Alfred	20, Marylebone Street
1853		Townson, Thomas	Plough Court
1842		Tuck, William H.	1, Grove Street, Mile End Road
1853		Tupholme, John T.	20, St. Paul's Villas, Ball's Pond
1853		Turner, Richard	2, Oxenden Street, Haymarket
1853		Tustin, Thomas H.	London Hospital
1842		Twinberrow, William	2, Edward Street, Portman Squa
1852	90	Urwick, William W.	35, Denbigh Street, Pimlico
1853		Vint, James	4, Commercial Terrace, Limehou
1841		*Wagstaff, John Henry	James Street, Westbourne Terra
1842		Walker, Alexander	10, Ireland Row, Mile End
1842		*Walker, Henry	35, Skinner Street, Somers Town
1853		Walker, Henry	9, Suffolk Place, Islington
1853		Walker, Frederick	1, Harleyford Place, Kennington
1844		Waller, Arthur	6, Middleton Square
1845		Ward, Francis	14, Grosvenor Street
1846		*Warner, Charles Heath	55, Fore Street
1841		Watts, John	107, Edgware Road
1844		Watts, William	3, Gray's Place, Brompton
1853		Watts, William M.	32, Whitecross Street
1853		Watts, Peter	11, Sol's Row, Hampstead Road
1856	110	Watts, Henry T.	8, Victoria Road, Pimlico
1841		Waugh, George	177, Regent Street

Year of Admission.	No. of Certificate.	NAME.	ADDRESS.
1841		Waylat, Robert	4, Pavement, Finsbury
1853		Wegg, William	10, North Place, Ball's Pond
1842		Westwood, William H.	16, Newgate Street
1842		Westwood, Robert	16, Newgate Street
1854	321	Wheeler, Christopher	5, Hackney Road
1841		White, John	228, Piccadilly
1841		White, Daniel	19, Terrace, Regent's Park
1852		White, Edmund	19, Terrace, Regent's Park
1853		Wilbe, Salmon	1, College Place, Chelsea
1842		Wilkes, George	1, Hayfield Place, Mile End
1853		Wilkinson, William	114, Lambeth Walk
1851		Williams, John	5, New Cavendish Street
1844		Willmott, William	83, High Street, Southwark
1853		Wilson, Thomas	Upper Holloway
1853		Windle, William	48, Portman Place
1842		Wooldridge, John	19, Bath Place, New Road
1855	364	*Wrangham, John	3, Acre Lane, Brixton
1853		Wright, William V.	11, Old Fish Street
1853		Wright, John...	60, George Street, Portman Square
1853		Wright, Joseph	1, Montford Place, Kennington
1842		Wyman, John	122, Fore Street
1841		Yarde, Giles	28, Lamb's Conduit Street
1842		Yates, Benjamin	25, Budge Row, Cannon Street
1852		Young, Frederick	137, Minories
1853		Young, George	Mill Wall, Poplar

COUNTRY MEMBERS.

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1846		Abbott, John Thomas	Darlington
1853		Abraham, John	Liverpool
1842		Abram, Joseph	Dereham
1852		Ackerman, Theophilus	Bristol
1845		Ackrill, George	Abergavenny
1847		Acton, George	Worcester
1853		Adams, John	Loughborough
1853		Adams, Jonathan Henry	Stoke-on-Trent
1853		Adkins, Henry James	Birmingham
1848		Adkins, William	Northampton
1849		Ainslie, William	Edinburgh
1852		Aitken, William	Edinburgh
1849		Albright, Henry	New Brighton
1853		Alderton, John	Hastings
1853		Aldridge, Alexander John	Brighton
1852		Alexander, James	Greenock
1848		Allanson, Charles	Harrogate
1847		Allen, Thompson	Boston
1853		Allen, Adam U.	Lymington
1853		Allis, Francis	Teignmouth
1853		Allsop, Francis John	Lincoln
1853		Alpass, Horace	Liverpool
1846		Althorp, James	Stamford
1842		Amoore, Charles	Hastings
1852		Anderson, James	Musselburgh
1853		Anderson, Charles Thomas	Jersey
1841		Anderson, Duncan S.	Edinburgh
1853		Andrew, William	Aberdeen
1841		Andrews, John Betts	Clare
1853		Andrews, Thomas William Cox	Norwich
1854	375	*Anness, Samuel Richard	Ipswich
1841		Anthony, Jacob	Bedford
1853		Archer, Thomas	Southam
1841		Argles, Henry	Maidstone
1841		Armstrong, Henry	Preston
1853		Arnold, Adolphus	Guernsey
1841		Arnold, Edward	Norwich
1853		Arrandale, Elihu	Denton
1842		Arthy, Joseph	Peterborough
1853		Ascough, Jesse	Wolverhampton
1853		Ash, James Freer	Exeter
1853		Ashton, John Swan	Leicester
1853		Ashton, William	Southport
1853		Aslin, John	Sunderland
1846		Asling, Brelsford	Spalding
1855		Astley, John	Coventry
1846		Atkins, Francis Thomas	Woolwich
1842		Atkins, Francis Thomas	Deptford
1853		Atkins, Samuel Ralph	Salisbury
1842		Atkins, John	Deptford
1853		Atkinson, Richard Marshall	Leeds

Year of Admission.	No. of Certificate	NAME.	RESIDENCE.
1842		*Atkinson, Stephen	Doncaster
1855	420	*Atkinson, Matthew	Manchester
1842		Attwood, George	Brompton
1850		Aubin, James	Jersey
1853		Babington, Christopher	Peterborough
1853		Bacchus, Moses P.	Portsea
1853		Backhouse, William	Leeds
1842		Badcock, John	Brighton
1852		Baildon, William	Edinburgh
1841		Baildon, Henry C.	Edinburgh
1853		Bailey, Richard	Penrith
1845		Baines, Richard	Blackburn
1841		Baker, William	Chelmsford
1850		Baker, Charles Patrick	Chelmsford
1852		Baker, William	Brentford
1842		Baker, William	Retford
1851		Baker, Philip B.	Rochdale
1855	391	*Balkwill, Frederick Pryor	Plymouth
1844		Ball, George Vincent	Banbury
1841		Ball, Joseph	Birkenhead
1842		Ballard, William	Abingdon
1842		Ballard, Edwin	Faringdon
1850		Balls, George	Deptford
1845		Bally, Edward F.	Baldock
1848	12	Bancroft, John James	Ruthin
1841		Banks, Morris	Birmingham
1853	373	Bannister, Edward	Havant
1853		Barber, George	Liverpool
1845		Barclay, John	Falmouth
1848		Barker, John Maw	Doncaster
1848		Barker, Edward N.	Colchester
1842		Barker, William Henry	Biggleswade
1846		Barling, Thomas	Weymouth
1842		Barlow, John	Manchester
1853		Barlow, Samuel	Darlington
1841		Barnes, James	Preston
1850		Barnett, William	Brighton
1853		Barnish, Edwin H.	Wigan
1853		Barns, Joseph	Rochdale
1853		Barritt, George	Croydon
1849		Barron, William	Cheltenham
1842		Barry, George	Northampton
1853		Barry, Edwin	Northampton
1853		Barry, James	Northampton
1853		Bartlett, William Hugh	Southampton
1842		Barton, Robert Doidge	Eastbourne
1847		Barton, Henry	Brighton
1853		Barton, Charles	Brighton
1852		Barton, William	Campbeltown
1846		Bassett, Charles	Pontypridd
1853		Batchelor, Charles	Fareham
1853		Bateman, John Bird	Manchester
1852		Bates, John	Bicester

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1853		Bath, Richard C.	Devonport
1842		Battle, John Richard	Lincoln
1855	207	Baxter, William Walmisley	Bromley
1842		Baxter, William	Bromley
1853		Bayley, George E.	Andover
1841		Baynes, James	Hull
1841		Beach, Thomas	Bridport
1852		Beard, James	Manchester
1853		Beaumont, William H.	Gravesend
1847		Beckett, John	Scarborough
1846		Beech, Joseph	Atherstone
1841		Beesley, Henry	Banbury
1844		Beesley, Thomas	Banbury
1841		Bell, William D.	Leeds
1851		Bell, William	Carlisle
1853		Bell, Edward C.	Dudley
1841		Bell, Frederick J.	Maldon
1841		Bennet, William	Bath
1842		Bennett, George	Newark
1850		Bennett, John W.	Leigh, near Oldham
1853		Bentham, Thomas	Southsea
1853		Berry, Henry James	Worthing
1853		Bettison, Joseph	Chesterfield
1854	365	Betts, George William	Spalding
1853		Betts, John	Woodbridge
1847		Bevan, Charles F.	Harwich
1853		Bew, Robert	Bilston
1850		Bidwell, John	Guildford
1842		Biggs, Robert	Bath
1852		Bingley, Thomas Gyles	Manchester
1853		Binns, Samuel	Sheffield
1848		Binsley. James	Edinburgh
1842		Birch, Thomas Edwards	Mold
1850		Bird, Ash Rudd	Ipswich
1842		Bird, Charles	Worcester
1841		Bishop, Robert	Eye
1849		Bishop, Thomas	Woolwich
1853		Black, James	Leven
1852		Blacklock, Henry	Bournemouth
1841		Blacklock, Joseph D.	Brighton
1842		Blackburn, Bailey	Bradford
1842		Blades, Christopher	Leek
1846		Blades, Holland	Nantwich
1842		Blades, Sheriff	Northwich
1845		Blackshaw, Thomas	Burslem
1856		Blake, William F.	Stroud
1853		Blamires, Samuel	Bradford
1842		Bland, John Handel	Stourbridge
1848		Bloor, Joseph	Derby
1853		Blunt, Thomas	Shrewsbury
1842		Boast, Thomas	York
1842		Bolton, Thomas	Tenterden
1853		Bomford, Esau	Witney

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1853		Bond, Laurence V.	Tiverton
1842		Bond, John	Great Yarmouth
1850		Bond, Charles	Leamington
1848		Boocock, John	Leeds
1852	116	Boorne, Charles	Bristol
1853		Booth, James	Blackburn
1854	271	Booth, Alfred	Manchester
1842		Booth, John	Heckmondwicke
1853		Booth, Thomas Buckley	Eccles
1841		Booth, James	Rochdale
1853		Booth, Aaron	Manchester
1855	304	Botham, William	Manchester
1842		Bottle, Alexander	Dover
1849		Bowen, Henry F.	Harrow
1843		Bowers, Thomas	Chester
1847		Bowers, James D.	Chester
1841		Bowerbank, Joseph	Cockermouth
1853		Bowerbank, Fawcett	Cockermouth
1853		Bowker, James	Manchester
1853		Bowles, Charles A.	Chester
1853	257	*Boyce, John Pierce	Windsor
1841		Boyce, John Pierce	Chertsey
1842		Braddock, William	Oldham
1842		Bragg, William B.	Market Harborough
1853		Brailey, Charles H.	Heavitree
1849		Bramwell, George	Liverpool
1853		Brandreth, John	Preston
1853		Brandreth, Lawrence	Preston
1842		Brayshay, William Bolam	Stockton
1846		Bremner, William	Thurso
1845		Brend, Thomas	Swansea
1852		Brereton, John	Manchester
1842		Brew, Thomas Archer	Brighton
1842		Brewster, William	Cambridge
1853		Brierly Richard	Stalybridge
1842		Briggs, James	Tipton
1853		Briggs, George	Goole
1843		Bright, Philip	Brecon
1850		Brimelow, Thomas	Farnworth
1842		Brocklehurst, James	Hyde
1853		Bromfield, William	Crewe
1853		Bromfield, Charles	Exeter
1848		Bromley, Charles	Liverpool
1853		Brothers, William	Folkestone
1846		Brown, William	Dunfermline
1852	121	Brown, David R.	Edinburgh
1850		Brown, Thomas	Lutterworth
1842		Brown, Charles	Belper
1846		Brown, Leonard Flintoff	Manchester
1845		Brown, William Scott	Manchester
1842		Brown, Henry	Oxford
1853		Brown, Thomas Dudley	Coventry

Year of Admission	No. of Certificate.	NAME.	RESIDENCE.
1853		Brown, Samuel	Spilsby
1853		Brown, Thomas	Tyldesley
1853		Brown, Thomson	Glasgow
1853		Brown, George	Selby
1853		Brumwell, George	Monkwearmouth
1853		Brumwell, Joseph C.	Burnley
1853	226	Bryce, James	Dunfermline
1847		Bryant, William	Huntingdon
1846		Buck, William	Colchester
1853		Buck, Richard C.	Dudley
1853		Bullus, William	West Bromwich
1853		Bunn, Charles	Nayland
1842		Burdon, John	Durham
1848		Burdwood, James	Plymouth
1849		Burgess, William Henry	Dover
1853		Burns, James Adams	Stirling
1846		Burne, Robert Thomas	Houghton-le-Sprin
1853		Burnett, Robert	Frazerburgh
1853		Burrell, George	Montrose
1852		Burrow, William B.	Great Malvern
1853		Burrow, John Severn	Great Malvern
1853		Bustin, William	Shotley Bridge
1852		Butcher, Thomas	Cheltenham
1841		Butler, Samuel	Bristol
1841		Butler, William	Wycombe
1853		Butler, Thomas E.	Leicester
1856	379	Butler, John S.	Liverpool
1841		Butterfield, James Morse	York
1853		Caddick, John	Newcastle-under-L
1853	77	Caley, Albert Jarman	Windsor
1849		Calvert, Robert	Stokesley
1842		Calvert, James	Belper
1846		Campbell, Donald	Glasgow
1853	323	Campbell, Edward	Sunderland
1852	122	Carmichael, Lauchlan	Edinburgh
1842		Carr, William	Leicester
1841		Carr, William Graham	Berwick
1844		*Carran, Thomas	Peel, Isle of Man
1853		Carruthers, Richard Birrell	Dumfries
1844		Cartwright, William	Newcastle-under-L
1850		Carter, William	Manchester
1853		Chamberlin, William	Leicester
1842		Chantry, George	Goole
1855	62	Chaplin, John Lambert	Colchester
1846		Chaplin, Alfred	Lewes
1853		Chapman, Henry	Ipswich
1853		Chapman, William	Ipswich
1853		Chapman, Henry	Clifton
1849		Chapman, Richard J.	Chipping Ongar
1841		Chapman, John Cook	Congleton
1853		Chapman, John	Tring
1853		Chapman, William	York
1853		Chapman, William Fox	Hull

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1842		Chapman, Edward	Hull
1841		Chater, Jonathan	Watford
1853		Chaundy, Thomas G.	Oxford
1842		Chave, John Anstey	Uxbridge
1856	178	Chenery, William H.	Ipswich
1851		Cheshire, John	Grantham
1853		Childs, Joseph Linington	Portsmouth
1853		Childs, James Linington	Southsea
1842		Chipperfield, Robert	Shirley
1851		Christian, Francis	Birmingham
1853		Churchill, John	Birmingham
1856		Churchouse, William B.	Chard
1847		Clarke, William	Durham
1845		Clarke, John Webster	Leicester
1841		Clarke, Joseph	York
1853		Clarke, Benjamin Joseph	Cheltenham
1853		Clarke, William	Longsight
1846		Clarke, Thomas Meadows	Richmond
1852		Clarke, Frederick	Watford
1853		Clarke, Robert	Devizes
1855	334	Clarke, William W.	Dorking
1856	244	Clarke, Thomas	Somerton
1853		Clater, Francis	Retford
1841		Clay, Robert	Liverpool
1854	201	Clayton, John Oates	Leeds
1853		Clennell, John Morton	Newcastle-on-Tyne
1849		Clift, Edward	Lewisham
1845		*Coates, William	Leeds
1853	123	Cobb, John S.	Yarmouth
1852		Cochrane, Thomas	Falkirk
1853		Cock, John	Shipdham
1842		Cocking, George	Ludlow
1853		Cockton, John	Maryport
1841		Colbeck, George Royde	Leamington
1845		Cole, Edward Charles	Calne
1848		Cole, Walter Thomas	Weymouth
1853		Cole, John	Whittlesea
1841		Coleman, James	Cardiff
1853		Collier, William	Sheffield
1849		Collings, William Henry	Bristol
1852		Colton, Thomas	Selby
1853		Conacher, David	Mackinch
1853	185	Constable, Edwin	West Bromwich
1842		Conway, William	Pontypool
1847		Cooling, John	Newark
1850		Cooper, George Brown	Brightlingsea
1852		Cooper, James Robert	Birmingham
1841		Cooper, Thomas	Leicester
1845		Cooper, Mark Ward	Bridlington
1841		Cooper, George	Exeter
1841		Cooper, James Newbury	Bristol
1845		Cooper, Thomas	York
1842		Corbyn, Joseph B.	Beccles
1853		Corfield, Thomas J. T.	St. Day

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1843		Cornelius, Richard Bussell	Teignmouth
1845		Cornish, Henry Roberts	Penzance
1843		Cornish, William	Brighton
1841		Corrie, Charles	Bedford
1841		Cortis, Charles	Worthing
1853		Cottee, William	Salford
1853		Cotterell, William Henry	Dover
1841		Cotton, Gilbert Knill	Barnstaple
1853		Coupland, Henry	Liverpool
1853		Coupland, Joseph	Harrogate
1842		Cousins, Thomas George	Oxford
1842		Coverley, John	Scarborough
1845		Cowell, Silas	Canterbury
1845		Cowgill, Brian Y.	Burnley
1841		Crafton, Ralph Caldwell	Croydon
1842		Craske, Samuel	Holt
1853		Crarer, John	Blairgourie
1853		Crick, George Edward	Maldon
1842		Critchley, John	Blackburn
1842		Crocker, Henry Radcliffe	Brighton
1853		Crofts, Holmes Cheney	Chatham
1852	124	Croley, William	Edinburgh
1842		Cronshey, James	Thetford
1841		Crook, George	Farnham
1841		Cropper, James	Long Sutton
1847		Cross, William Gower	Shrewsbury
1853		Croskell, Charles	York
1853		Crossley, Smith	Halifax
1853		Crow, John William	Leicester
1853		Crowe, Henry Joseph	Tredegar
1853		Crowder, Charles H.	Hull
1846		Crowther, Thomas	Tickhill
1841		Cubitt, George	Norwich
1851		Cuff, Robert C.	Bristol
1852		Cumbers, John	Wandsworth
1853		Cumine, Frederick H.	Southport
1841		Cupiss, Francis	Diss
1853		Currie, John	Glasgow
1854	273	Cuthbert, John Mason	Bedford
1842		Cutting, James Bray	Leamington
1848		Cutting, Thomas	Selby
1853		Cutts, Thomas	Basford
1842		Dale, George	Chichester
1855		Dance, William D.	Stourport
1853		Dandie, David	Perth
1855	126	Dandie, Robert	Perth
1850		Davenport, Edward	St. Alban's
1848		Davids, George Ware	Brighton
1846		Davidson, John	Berwick
1853		Davidson, Charles	Aberdeen
1853		Davies, Thomas	Cheltenham
1841		Davies, Samuel	Chester
1853		Davies, John L.	Hay

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1853		Davies, Peter Hughes	March
1853		Davies, William Henry	Pillgwenlly
1842		Davies, Richard Morgan	Carmarthen
1841		Davis, John	Dorchester
1841		Davis, Robert	Dorchester
1845		Davis, John Oliver	Folkstone
1848		Davis, John Oliver, jun.	St. Leonard's
1841		Davis, Francis	Leominster
1841		Davis, Henry	Leamington
1842		Davis, Francis	Newbury
1845		Davison, Ralph	York
1842		Davy, Henry	Wiveliscombe
1854		Dawe, Sampson	Monmouth
1841		Dawe, Sampson R.	Swansea
1853		Dawson, Thomas	Preston
1853		Dawson, Stanhope	Deptford
1853		Day, George	Blackheath
1852		Deacon, George F.	Beccles
1853		Dearlove, Thomas D.	Brackley
1845		Death, John William	Brompton
1853		De Bois, Frederick	Glasgow
1853		De Carle, Joseph	Modbury
1853	194	Deck, Arthur	Cambridge
1845		Dennison, Matthew	Dudley
1853		Densham, John B.	Plymouth
1852		Dewar, Peter S.	Dingwall
1842		Dexter, James	Eastbourne
1842		Dickerson, Henry	Devonport
1845		Dickins, Richard	Aylesbury
1853		Dickinson, James B.	Leeds
1847		Dingley, Richard Loxley	Maidstone
1853		Dixon, Benjamin	Norwich
1854	381	*Dixon, William	Southampton
1842		Dobinson, William	Sunderland
1853		Dobson, James	Keswick
1847		Dodman, Robert	Thorney
1842		Dodshon, Edward	Sunderland
1852		Done, John	Manchester
1853		Donnall, George Sawl	Totness
1850		Dores, James	Alnwick
1855		Doughty, Richard	Bushey
1842		Dowell, William Cuming	Bristol
1845		Dowman, George	Southampton
1847		Down, Richard Haydon	Torpoint
1853		Downes, Joseph	Norwood
1847		Downing, Joseph Gregory	Braintree
1852		Dowthwaite, William	Barnet
1841		Drage, William F.	Birmingham
1841		Dresser, Richard	York
1853		Drew, John	Pershore
1842		Dron, William	Kirkcaldy
1852		*Dudgeon, George	Nottingham
1841		Duck, Daniel	Guisborough

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1846		Duckett, Joseph B.	Bradford
1842		Duggan, Henry	Hereford
1853	184	Duncan, William	Rothesay
1841		Duncan, John	Edinburgh
1842		Duncan, Frederick MacRae	Sandwich
1842		Dunhill, William	Doncaster
1853		Duprey, Jean A. B.	Jersey
1853		Durant, Frederick	Dorking
1853		Durant, Edmund	Dorking
1847		Dutton, John	Birkenhead
1842		Dutton, George	Bolton
1853		Dyer, John	Margate
1842		Dyer, Thomas Dyer	Exeter
1853		Dyer, William	Halifax
1842		Dyson, John	Andover
1853		Eastes, Thomas Henley	Dover
1853		Edgar, James	Westerham
1853		Edmonds, Benjamin M.	Lowestoff
1853		Edmondson, John	Preston
1853		Edwards, James	Leicester
1848	22	*Edwards, John Baker	Liverpool
1853		Edwards, William	Sidmouth
1850		Edwards, Henry	Lincoln
1842		Edwards, George	Dartford
1853		Edwards, William	Denbigh
1853		Ekins, William	Huntingdon
1842		Eliott, Samuel	Liskeard
1842		Ellaby, John	Melton Mowbray
1842		Ellis, Benjamin	Shepton Mallett
1853		Ellis, William	Abergell
1849		Ellis, Richard	Thornbury
1841		Ellison, John	Liverpool
1845		Elsey, John	Horncastle
1847		Ely, George	Bingham
1843		*England, William Paul	Huddersfield
1848		Ereaut, John	Jersey
1853		Ereaut, George	Jersey
1853		Etherington, Thomas G.	Brighton
1846		Etherington, Joseph	Bishop's Auckland
1851	43	Evans, Thomas	Liverpool
1842		Evans, Edward	Liverpool
1842		Evans, Thomas B.	Liverpool
1854	47	Evans, Henry S.	Liverpool
1842		Evans, John	Hemel Hempstead
1853		Evans, Samuel	Caerphilly
1853		Evans, William Luke	Cardiff
1853		Evans, John	Narbeth
1847		Evans, Thomas	Aberdare
1853		Evans, William Downing	Newport, Monmout
1842		Eyre, Alfred B.	Ipswich
1842		Eyre, Thomas S.	Launceston
1844		Fairbank, James Hack	Woolwich
1853		Fairley, Thomas	Sunderland

Year of Admission.	No. of Certificate.	NAME	RESIDENCE.
1841		Fairweather, John	Newcastle
1853		Falkner, Richard	Banbury
1842		Farmer, John	Putney
1853		Farrage, Robert	Rothbury
1850		Farrant, Henry	Ottery St. Mary
1854	99	Farrer, John D.	Chester
1853		Farrow, William	Woburn
1842		Fergusson, John	Liverpool
1842		Fielder, Thomas Woolridge	Newbury
1842		Finch, John	Cheltenham
1846		Finch, Jacob	Swaffham
1843		Fincham, Henry S.	Blackheath
1852		Finlayson, Thomas	Leith
1854	195	Fisher, William Henry	Liverpool
1851		Fisher, John Thornhill	Torquay
1853		Fiske, Charles	Ipswich
1843		Fitch, Robert	Norwich
1842		Fitt, Edward	Barking
1841		Fleeming, William	Wolverhampton
1842		Fletcher, Francis	Cheltenham
1849		Fletcher, Cornelius	Nottingham
1853		Flinn, John James	Liverpool
1841		Flockhart, William	Edinburgh
1853		Flower, Thomas S.	Matlock—Bath
1842		Foggitt, Thomas Jackson	Thirsk
1841		Forbes, William	Reigate
1853		*Forge, Christopher	Bridlington
1853		Forman, George	Birmingham
1853		Forrest, Richard William	Gainsborough
1853		Forster, John	Whitehaven
1853		Forster, John	Sunderland
1853		Forsyth, William	Aberdeen
1853		Foster, Alfred Hood	Birmingham
1841		Foster, Joseph	Collumpton
1845		Foster, James Fawcett	Hull
1842		Foster, Edward	Ludlow
1849		Foster, Henry J.	Maidstone
1853		Foster, John	Uckfield
1855		Foster, George Pitt	Tetbury
1846		Fowke, George	Stafford
1853		Fowler, Edward	Bedale
1849		Fox, Charles James	Witney
1842		Francis, George	Witham
1853		Franks, Alfred	Ramsgate
1853		Fraser, Charles	Largs
1853		Frazer, Daniel	Glasgow
1844		Freestone, Thomas Morris	Bristol
1841		French, Gabriel	Chatham
1849	3	French, Joseph B.	Chatham
1853		Fresson, Lewis Francis	Stevenage
1851		Frost, William Henry	Collumpton
1841		Fryer, Henry	Huddersfield
1851		Funnell, William Henry	Brighton

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1849		Furmston, Samuel C.	Dartford
1853		Gall, Benjamin David	Woodbridge
1852	168	Gall, Alexander	Burntisland
1842		Gamble, Richard	Grantham
1841		Garbutt, Cornelius	Gateshead
1853		Garbutt, Cornelius D.	Gateshead
1842		Gardener, Charles	Tunbridge Wells
1841		Gardner, James	Edinburgh
1853		Garland, William	Leeds
1850		Garle, William	Uttoxeter
1846		Garlick, Thomas H.	Halifax
1853		Garlick, John	Holmwood
1853		Garnett, Joseph	Newcastle-on-Tyne
1851		Garnham, Barrington	Brighton
1842		Garratt, John Colpman	Rugby
1842		Garside, Burdett	Southport
1847		Gascoigne, George	Harrogate
1842		Gay, George	Stroud
1853		Geake, John	St. Columb
1846		Geldard, John	St. Austell
1842		Geldard, Richard Kelly	Plymouth
1853		Gerrard, Joseph	Longton
1841		Gibbons, William	Plymouth
1852		Gibbs, William	Ryde
1853		Gibson, William Middleton	Bristol
1851		Gilbert, George	Portsea
1847		Gilpin, Benjamin	Newcastle-on-Tyne
1847	37	*Giles, Richard William	Clifton
1841		Giles, Richard Bobbet	Clifton
1842		Gill, Samuel	Pendleton
1856	433	Gissing, Thomas W.	Wakefield
1844		Glaisby, John	York
1841		Glaisyer, Thomas	Brighton
1852	71	Glanfield, George	Torquay
1853		Glasier, Samuel	Manchester
1853		Glew, William	Selby
1850		Glover, Samuel	Liverpool
1841		Gloyne, Thomas Hadfield	Dewsbury
1845		Glynn, William	Torquay
1848		Goadsby, Thomas	Manchester
1816		Goddard, Henry Edward	Great Yarmouth
1842		Goddard, Joseph	Leicester
1842		Goodall, Thomas	Ensham
1841		Goodall, John	Newcastle-on-Tyne
1850		Goodall, Henry	Derby
1841		Goode, Thomas	Congleton
1853		Goodrich, George	Dursley
1845		Goodson, Joseph	Beeston
1842		Gordelier, Paul William Gibbs	Sittingbourne
1853		Gordon, Alexander	Aberdeen
1853		Gordon, John	Edinburgh
1853		Goss, Samuel	Barnstaple
1853		Gould, John G.	Teignmouth

CORRECTED PAGE.

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1841		Gow, Alexander	Wolverhampton
1852	130	Gray, Alexander F.	Edinburgh
1852	131	Gray, John	Cupar, Angus
1848		Gray, William	Rothwell
1853		Greaves, Abraham	Ironville
1844		Greaves, John	Bakewell
1853		Greaves, William	Leeds
1842		Greaves, Richard	Ripon
1853		Green, Robert Poynton	Witham
1853		Green, George	Selby
1848		Green, John	Birkenhead
1853		Green, William M.	Liverpool
1842		Green, William	Bath
1854	245	Green, James	Droitwich
1853		Greenough, George	Manchester
1849		Greenwell, William C.	Newcastle
1848		Greenwood, John	Harrogate
1853		Gregory, Edward James	Cheltenham
1853		Greig, William	Glasgow
1852		Griffith, Robert	Carnarvon
1844		Griffith, Charles	Weston-super-Mare
1846		Griffith, Richard	Slough
1853		Griffiths, John	Manchester
1853		Griffiths, John	Narberth
1853		Griffiths, William	Swansea
1855	18	*Grindley, Robert D.	Chester
1853		Groom, William Bishop	Liverpool
1852		Grounds, George Field	Bishop Stortford
1842		Grounds, Ambrose	Ludlow
1841		Groves, Simon	Blandford
1854	95	Groves, Wellington E.	Blandford
1853	103	Groves, Thomas Bennett	Weymouth
1853		Groves, Edward	Hammersmith
1852		Grundy, Edwin	Lenton
1842		Gulliver, Walker Job	Lutterworth
1842		Gundry, William	Bristol
1842		Gunner, George	Winchester
1841		Gurnell, Thomas	Dartford
1846		Guy, Guy	Helstone
1841		Gwatkin, James Thomas	Brighton
1852		Gwillim, John Cole	Newport, Monmouth
1853		Hadfield, John	Congleton
1841		Hadfield, William	Congleton
1853		Hadfield, William P.	Newark
1853		Hadfield, Frederick B.	Bury St. Edmunds
1850		Hagley, William Thomas	Ilminster
1852		Haigh, Joseph	Leeds
1842		Haines, John Jenkins	Bromsgrove
1853		Hale, Jacob H.	Bristol
1843		Hall, Joseph	Salford
1852		Hall, Thomas	Newcastle-on-Tyne
1848		Hall, Thomas Slocombe	Truro
1852	4	Hall, John Richard	Canterbury

Date of Admission	No. of Certificate.	NAME.	ADDRESS.
1853		Hall, Richard	Brecon
1853		Hall, Henry R. F.	Hull
1853		Hall, Robert	Stamford
1842		Hall, George	Huddersfield
1842		Hall, John Dean	Wycombe
1853		Hall, John Eaton	Southampton
1849		Hall, Thomas	Grantham
1849		Hallam, Edward	Axbridge
1842		Hallsworth, Thomas	Manchester
1850		Ham, Charles H.	Exeter
1853		Ham, John	Nether Stowey
1841		Hambrook, Odden	Dover
1853		Hamer, John	Manchester
1853		Hamilton, Julius	Poole
1846		Hammon, Richard	Folkestone
1855	383	Handley, John	Wakefield
1853	230	Hardie, James	Dundee
1853		Harding, James John	Sudbury
1853		Hardman, Thomas B.	Liverpool
1853		Hare, Josiah William	Harleston
1852		Hargreaves, Henry	Oldham
1842		Harold, William	Battle
1842		Harper, Henry	Leamington
1853		Harrington, Richard B.	Rayleigh
1852		Harrington, Arthur	Rochford
1854	203	Harris, William Harry	Northampton
1853		Harris, Daniel Roteley	Ware
1853		Harris, Joshua	Wolverton
1853		Harrison, Thomas	Leeds
1842		Harrison, Thomas	Bradford
1842		Harrison, James Parker	Carlisle
1848		Hart, James	Bolton
1852		Hart, Hugh	Glasgow
1853		Hart, George William	Hull
1841		Hartland, James	Bristol
1853		Hartley, Robert	Manchester
1853		Hartshorn, William H.	Ironbridge
1853		Hartshorn, Henry	Ironbridge
1853		Hartshorn, Thomas	Ironbridge
1841		Harvey, Thomas	Leeds
1851		Harwood, John	Putney
1842		Haselar, Albert	Cranbrook
1848		Hatfull, Robert	Deptford
1842		Hattersley, John	Barton-on-Humber
1853		Hawkins, Henry Ford	Rugeley
1847		Haydon, Frederick Walter	Fordingbridge
1842		Haydon, Henry William	Dawlish
1853		Hayman, Alfred	Neath
1845		Hayward, William G.	Reading
1845		Hayward, Edward	Ipswich
1853		Hayward, Charles	Manchester
1847		Hazell, Robert W.	Maidstone
1842		Head, John	Lewes
1842		Headley, Morris	Bridlington Quay
1846		Heald, William	Sleaford

Year of Admission.	No. of Certificate.	NAME.	ADDRESS.
1853		Healey, Samuel George	Hull
1841		Heath, Edward	Cromer
1845		Heathcote, Thomas Sarl	Newcastle-under-Lyne
1847		Heaton, John Scholes	Manchester
1841		Hedderley, John	Nottingham
1853		Hedderley, Samuel	Nottingham
1842		Hellowell, Daniel	Leeds
1856	231	Helmrich, William	Ayr
1842		Heming, Richard George	Worcester
1853	285	Heming, Robert	Sunderland
1848		Hempsted, Robert	St. Leonard's
1853		Henderson, John	Aberdeen
1853		Henley, Henry	Lyme Regis
1853		Henshall, John	Congleton
1853		Hensleigh, Henry	Plymouth
1852		Hepworth, William	Manchester
1853		Herington, Joseph	Cranley
1845		Hern, William Henry	St. Austell
1853		Hewett, William Henry	Great Yarmouth
1853		Hewlins, Edward	Leatherhead
1842		Hibbert, Walter	Neath
1845		Hick, Matthew Bussey	Wakefield
1846		Hick, Allan	Wath
1845		Hick, Joseph	Bradford
1842		Hickman, Joseph Frederick	Newbury
1852		Hicks, Robert	Lerwick
1853		Hifley, Richard James	Devonport
1853	96	Higgins, Thomas S.	Huddersfield
1843		Higgins, William	Chester
1842		Higgs, John Seagrave	Market Harborough
1842		Highway, Henry	Walsall
1849		Hill, Lawrence	Sherborne
1853	192	Hill, Charles William	Burnley
1842		Hill, Richard	Bruton
1853		Hill, William	Manchester
1853		Hill, Simon	Plymouth
1841		Hill, John	Sheffield
1854	246	Hill, Thomas	Deddington
1853		Hinchcliffe, Ferrand	Manchester
1853		Hincks, Thomas R.	Chester
1853		Hinds, James	Coventry
1853		Hine, Alfred	Beaminster
1842		Hitchcock, Charles Edmund	Colchester
1842		Hitchcock, William Richards	Taunton
1853		Hobson, Charles	Beverley
1847		Hodder, Henry	Bristol
1853		Hoddy, Benjamin	Coggeshall
1852	133	Hodgeton, David	Brechin
1853		Hodgetts, George	West Bromwich
1841		Hodgson, Edward	Stockton
1853		Hodkinson, Henry	Macclesfield
1853		Hogg, Henry	Bristol
1853		Hogg, Thomas	Bideford
1844		Holden, James	Burley
1853		Holden, Richard	York

Year of Admission.	No. of Certificate.	NAME.	ADDRESS.
1842		Holdsworth, Mark	Horncastle
1853		Holdsworth, Thomas W.	Birmingham
1853		Holland, William Charles	Tring
1854		Holland, William	Market Deeping
1841		Hollick, Thomas	Chatham
1841		Hollier, Elliott	Dudley
1843		Holt, George Palmer	Bexley Heath
1853		Holt, Richard Wylde	Seacombe
1842		Holtum, Edward	Canterbury
1842		Holyoake, William	Manchester
1853		Hooker, Thomas E.	Wellington
1842		Hooper, Henry	Brighton
1853		Hopper, Richard	Sunderland
1841		Hopwood, Henry J. S.	Richmond, Surrey
1841		Horner, Stephen	Hartlepool
1845		Hornsby, John Harwood	Odiham
1853		Horsey, James	Portsea
1853		Horsfield, John Morell	Prestwich
1851		Houghton, James	Liverpool
1853		Houghton, Thomas	Oxford
1856		Houlton, James	Wetherby
1841		Howard, Robert	Stratford-le-Bow
1853		Howard, John Eliot	Stratford-le-Bow
1853		Howard, Richard	Tunbridge Wells
1842		Howard, John	Manchester
1842		Howman, Philip	Winchcombe
1846		Howorth, James	Doncaster
1853		Howroyd, Joseph	Salford
1855		Howson, Thomas J.	Newcastle
1851		Howson, Thomas B.	Oxford
1853		Hubbard, Robert William	Kenilworth
1842		Hudson, Richard	Kendal
1851	10	Huggins, George Thomas	Barnet
1849		Hughes, Edward	Altrincham
1842		Hughes, Samuel	Stourbridge
1842		Hulbert, Robert Skeat	Basingstoke
1853		Hulme, John Hughes	Norwich
1853		Hulme, Thomas	Oldham
1842		Humphreys, Matthew	Nottingham
1851		Hunt, Thomas	Croydon
1852	135	Hunter, David	Edinburgh
1853		Hunter, John	Gosport
1842		Huntley, John	Wimborne
1855		Hurdon, James	Appledore
1853		Hurman, John	Bridgewater
1844		Hurst, William T. H.	Abergavenny
1845		Husband, Matthew	Exeter
1851		Hutchinson, James	Manchester
1853		Iliffe, Thomas	Nuneaton
1853		Ingham, Richard H.	Manchester
1853		Ingham, Henry	Wellingore
1853	306	Isaac, George Washington	Bristol
1852		Iverach, William	Kirkwall
1854	136	Jaap, John	Glasgow

Year of Admission.	No. of Certificate.	NAME.	ADDRESS.
1850		Jackson, William R. P.	Ewell
1842		Jackson, William George	Hartlepool
1845		Jackson, Edmund	Lancaster
1841		Jackson, Thomas	Manchester
1849		Jackson, Robert	Manchester
1852		Jackson, Robert R.	Liverpool
1852	105	Jackson, William	Stowmarket
1853		Jackson, John	Morley
1853		Jackson, Henry	Liverpool
1853		James, John Parry	Cardiff
1853		James, Henry	Bognor
1842		James, John	Truro
1853		Jameson, Walter C.	Bath
1853		Jefferson, Peter	Leeds
1853		Jeffery, Russell	Cheltenham
1846		Jenkins, Henry Maine	Christchurch
1853		Jenkins, John	Peterchurch
1855	286	Jennings, John Edgell	Southampton
1841		Jennings, William	Halifax
1842		Jennings, Reginald	Hereford
1853		Jessop, Jonathan	Halifax
1853		Jewison, Robert	Thorne
1842		Job, Richard Osman	Truro
1852		Jobson, William	Dundee
1853		Johnson, Thomas	Leek
1841		Johnson, John H.	Liverpool
1853		Johnson, John B.	Uttoxeter
1841		*Johnson, Samuel	Liverpool
1853		Jones, John	Aberdare
1842		Jones, Edward Bowen	Carmarthen
1845		Jones, Samuel Urwick	Leamington
1845		Jones, John	Holywell
1842		Jones, William	Liverpool
1853		Jones, David	Narberth
1853		Jones, Owen Lewis	Liverpool
1848		Jones, Charles	Birkenhead
1853		Jones, Ellis Powell	Rhyl
1848		Jones, James	Salford
1841		Jones, Charles	Hanley
1853		Jones, Thomas J.	Newport
1841		Jones, William B.	Kingston-on-Thames
1853		Jones, William Thorpe	Southwell
1844		Jones, Oliver Ellis	Welshpool
1853		Jones, Thomas	Welshpool
1850		Jones, William A.	Waterloo
1842		Judson, Thomas	Ripon
1846		Jull, Thomas	Romford
1853		Keall, Powell Skinner	Bristol
1845		Keeling, George Ratcliffe	Epsom
1852		Keene, Alfred	Leamington
1853		Keith, James	Aberdeen
1852	137	Kemp, David	Portobello
1841		Kemp, Grover	Brighton
1854		Kemp, John	Brighton

Year of Admission.	No. of Certificate.	NAME.	ADDRESS.
1841		Kendall, Frederick	Stratford-on-Avon
1844		Kendall, George	Masham
1853		Kennedy, William	Glasgow
1853		Kent, Alfred	Stratford-le-Bow
1851		Kenwrick, Edwin C.	Birmingham
1853		Ker, Thomas Foster	Manchester
1852		Ker, Thomas	Edinburgh
1853		Kernick, Samuel Penrose	Cardiff
1843		Kernot, Joseph	Naples
1846		Kernot, Septimus	Naples
1853		Kershaw, Joseph	Manchester
1847		Kershaw, James	Southport
1852	81	Kershaw, George	Hitchin
1842		Kiddy, Samuel	Belper
1841		Kimbell, Henry	Knowle
1853		Kimberly, George	Bilston
1841		Kinch, Charles	Henley-on-Thames
1852		Kinder, John	Glossop
1853		King, William George	Market Drayton
1841		King, Thomas Simmons	Rochester
1853		King, William	Soham
1853		King, Charles Montague	Southend
1853		King, Ellis	Southend
1854	276	Kirk, John	Maidstone
1853		Kirk, Charles	Hartley Row
1853		Kirk, Thomas	Liverpool
1853		Kirkbride, William	Penrith
1853		Kirkus, Joel	Liverpool
1853		Kirkwood, William	Stirling
1842		Kirton, Joseph Bishop	Hull
1842		Kitching, Charles	Haverhill
1853		Knapman, John	Exeter
1842		Knight, Edward Sackville	Bridport
1843		Knight, Alfred	Cirencester
1842		Knight, John Messer	Rochester
1841		*Knott, Thomas	Exeter
1844		Knowles, Richard John	Demerara
1852		Knowles, John J.	Sandwich
1853		Lacy, John	Reepham
1853	187	Laird, William	Dundee
1853		Lamotte, Thomas Gallye	Bristol
1853		Lancaster, Henry	Croydon
1842		Land, John	Leeds
1853		Lane, Joseph	Hampstead
1842		Langford, William	King's Lynn
1843		Lansdale, Ralph	Wycombe
1841		Large, Henry	Nottingham
1853		Lasham, John	Dedham
1841		Lathbury, Robert	Liverpool
1842		Lavers, Thomas Howard	Lewisham
1855	378	*Lavington, Edwin	Bristol
1853		Law, William	Forfar
1842		Lea, Henry Clairmont	Hastings
1853		Lea, Samuel	Ellesmere
1841		Lea, John Wheeley	Worcester

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1853		Leach, William	Ashton-under-Lyne
1855		Leadbetter, William Austin	Melton Mowbray
1841		Leay, Joseph	Birmingham
1853		Leech, William	Colchester
1846		Leggatt, John Tudway	Wareham
1853		Leighton, John H.	Durham
1852		Leith, James	Edinburgh
1853	138	Lever, William	Hastings]
1853		Lewis, Thomas V.	Ebbu Vale
1841		Lindsay, Robert	Edinburgh
1841		Lines, George	Hertford
1849		Linsley, Thomas	York
1844		Lister, George	Cottingham
1854	215	Littlefield, James Wavell	Ventnor, Isle of Wight
1842		Lloyd, Edmund	Richmond
1841		Lloyd, Frederick Rugge	Highgate
1853		Lloyd, Thomas Henry	Woolwich
1853		Lloyd, Henry	Deptford
1853		Lock, William	Boston
1846		Lockyer, George	Deptford
1853		Loggin, Charles Frederick	Stratford-on-Avon
1853		Longfield, Joseph	Leeds
1853		Longrigg, John	Appleby
1853		Lord, Ellis	Rochdale
1853		Lord, Charles	Todmorden
1841		Lofthouse, James	Hull
1841		Lovett, John	Gloucester
1841		Lowe, Thomas	Liverpool
1842		Lowndes, Hervey	Stockport
1853		Luff, William	Oxford
1853		Lumsden, James	Peterhead
1853		Lupton, Thomas	York
1842		Lynch, John R.	Manchester
1842		Mabson, William	Great Yarmouth
1853		Macdonald, John Thomas	Wisbeach
1853		McDiarmid, John B.	Deal
1842		Macfarlane, John F.	Edinburgh
1852	139	Macfarlane, Wardlaw	Edinburgh
1853		McGregor, Andrew	Glasgow
1853		McGuffie, John R.	Liverpool
1841		Mackay, John	Edinburgh
1852		Mackintosh, Archibald	Rothesay
1856	140	Mackintosh, James	Galashields
1841		Maddock, William	Tunbridge Wells
1853		Madge, James	Devizes
1848		Maggs, Samuel Blount	St. Leonard's
1845		Maggs, Thomas	Yeovil
1845		Maleham, Henry	Sheffield
1844		Maling, William	Newcastle-on-Tyne
1842		Manfield, John W.	Salford
1853		Manifold, John J.	Weaverham
1853		Mansley, Allen	Leigh
1841		Manthorp, Samuel	Colchester
1850		March, William	Newark

Year of Admission.	No. of Certificate.	NAME.	RESIDENC
1846		Marchant, Charles Frederick	Ipswich
1845		Marder, James Wood	Lyme Regis
1846		Marks, George	Bradford
1853		Marlor, Jabez	Lees, near Oldh
1849		Marrison, George	Calne
1845		Marsden, Joseph	Middleton-in-Te
1852		Marsh, Joseph T.	Wirksworth
1842		Marsh, William M.	Sevenoaks
1842		Marshall, John F.	Gainsborough
1853	311	Marshall, Robert	Boston
1842		Marshall, James A.	Waltham Abbey
1842		Marston, Richard	Ludlow
1842		Martin, Edward W.	Guildford
1845		Martin, Thomas	Lewes
1841		Martin, John	Bristol
1841		Martin, Charles	Stroud
1851		Martin, Henry G.	St. Albans
1853		Martin, Thomas	Liverpool
1853		Martyn, John J.	Brighton
1853		Mason, Joseph W.	Cirencester
1842		Mason, William W.	Manchester
1853		Mason, William	Hastings
1853		Mather, William	Manchester
1853		Mathias, William B.	Glasgow
1853		Maunder, Alexander	Weston-super-M
1853		Mawson, John	Newcastle-on-T
1842		May, Enoch	Tewkesbury
1842		May, Charles	Reading
1848		Maynard, Robert H.	Brandon
1842		Mays, Robert James John	South Shields
1843		Meadows, John	Leicester
1842		Mease, Solomon	North Shields
1853		Mease, Robert D.	North Shields
1842		Meatyard, Robert	Basingstoke
1853		Medd, Joseph	Gloucester
1842		Medcalf, Benjamin	Ware
1843		Medcalf, Ebenezer	Lower Tooting
1845		Medwin, Aaron	Blackheath
1853		Melhuish, John	Taunton
1842		Melson, John	Hull
1853		Meredith, Edwin Richard	Bristol
1850		Merrick, Thomas J.	Northampton
1853		Merryweather, Charles	Leicester
1854	106	*Metcalfe, Christopher	Hull
1853		Michell, John A.	Falmouth
1853		Millais, Thomas	Jersey
1853		Miller, Jeptha	Saffron Walden
1842		Miller, Charles	Oxford
1853		Miller, William	Liverpool
1853		Miller, William Henry	Sheffield
1853		Miller, John Thomas	Sheffield
1845		Mills, Robert M.	Bourne
1853		Mills, James Arthur	Dereham East
1853		Milton, William	Exeter

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1847		Mitchell, John	Manchester
1853		Mitchell, Thomas	Sunderland
1842		Mole, William Tingey	St. Neots
1846		Monro, Henry	Newcastle-on-Tyne
1844		Moor, Joseph	Bury St. Edmunds
1856	40	Moore, Edward H.	Shoreham
1846		Moore, John	Blackpool
1842		Moore, Henry	Worcester
1841		Mordaunt, Alfred	Southampton
1842		Morgan, Benjamin	Llandilo
1844		Morris, Alfred Philip	Stourbridge
1853		Morris, Philip Henry	Newport, Monmouth
1848		Morse, Charles B.	Bishop Stortford
1844		*Morse, George	Mortlake
1853		*Morton, Jameson	Ramsbottom
1852		Morton, John	Durham
1844		Morton, George	Stratford-le-Bow
1849		Moss, William	Carlisle
1853		Mount, William	Canterbury
1842		Mount, John	Manchester
1841		Mullett, Charles	Ilminster
1847		Mumbray, Robert George	Manchester
1853		Mumby, Charles	Gosport
1853		Munday, Edward Smith	Worthing
1851		Mundy, William	Melksham
1853		Murdoch, William	Glasgow
1852		Murdoch, George	Glasgow
1849	63	Murdoch, James	Glasgow
1853		Murdoch, David	Falkirk
1841		Muriel, Harry Brooke	Brighton
1849		Muskett, Charles	Diss
1842		Muskett, James	Harleston
1844		Musson, Telemachus G.	Birmingham
1842		Napier, James	Edinburgh
1853		Narracott, Henry	Torquay
1848		Naftel, Thomas S.	Guernsey
1856	262	Needham, Slater	Leicester
1842		*Negus, Samuel	Northampton
1853		Neil, John	Glasgow
1853		Newby, William Henry	Perth
1853		Newbery, Henry	Biggleswade
1853		Newcome, John	Grantham
1854		Newman, Robert	Bewdley
1845		Newman, Thomas	Hartley Row
1853		Newman, Walter F.	Falmouth
1853		Newton, George	Newcastle
1847		Newton, Christopher	Edinburgh
1853		Niblett, John	Stroud
1852		Nicol, George	Pulteney Town
1841		Nichol, Anthony	Newcastle-on-Tyne
1853		Nichol, Thomas Dale	Newcastle-on-Tyne
1853		Nicholas, John	Narberth
1841		Nicholls, James	Stourbridge
1842		Nielson, Francis E.	Buxton

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1850		Nightingale, Joseph S.	Hull
1843		Nightingale, Henry L.	Egham
1845		Nind, George	Wandsworth
1853		Nix, John K.	Billericay
1841		Noakes, Richard	Brighton
1846		Northcroft, Jonathan	Esher
1853		Norwood, Thomas	Hastings
1842		Oakey, Joseph Malpas	Preston
1853		Obbinson, Thomas	Sleaford
1844		*Oliver, William	Bristol
1853		Oliver, John	Liverpool
1842		Orange, John	Portsea
1845		Otter, William	Bloxham
1842		Overbury, Henry	Alcester
1845		Owen, Griffith	Caernarvon
1842		Owen, William	Newcastle-on-Tyne
1845		Owles, James	Bungay
1842		Owles, John	Yarmouth
1842		Pain, George Alison	Cambridge
1842		Paine, William	Canterbury
1841		Palk, Edward	Southampton
1841		*Palk, John	Exeter
1847		Palmer, Faithful	Cheltenham
1842		Palmer, Thomas J.	East Grinstead
1845		Palmer, Thomas William	Leicester
1842		Parker, Edward	Carlisle
1853		Parker, Frederick	Derby
1853		Parker, John	Birmingham
1853		Parker, Matthew	Bath
1853		Parker, William Henry	Leeds
1841		Parker, Thomas	Halifax
1842		Parkes, Joseph	Atherstone
1842		Parkes, Thomas	Woolwich
1853		Parkes, John C.	Woolwich
1854	312	*Parkes, John P.	Manchester
1842		Parkinson, Thomas	Liverpool
1841		*Parnell, John	Peterborough
1842		Parsons, Thomas	Leicester
1850		Parsons, John	Ottery St. Mary
1850		Parsons, William	Portsmouth
1853		Parton, Joseph	Nantwich
1353		Pasmore, George	Exeter
1853		Pate, Henry Thomas	Ely
1853		Paterson, William	Aberdeen
1853		Patterson, George	Stamford
1853		Patten, William Hinde	Stockport
1853		Pattinson, Richard John	Carlisle
1841		Paul, Horace	Halsted
1853		*Paulden, William	Altrincham
1841		Payne, Reuben Craven	Bridgewater
1853		Payne, William Frederick	Aylesbury
1854	314	Peake, Henry	Dover
1855	313	Peake, James	Walmer
1842		Pearce, Thomas	Gloucester
1853		Pearce, James	Kidderminster

Year of dmission	No. of Certificate.	NAME.	RESIDENCE.
1852		Pearless, John	East Grinsted
1853		Pearman, Henry	Stourbridge
1842		Pearson, Charles James	Swansea
1842		Peart, David	Witham
1842		Peat, Walter	Fareham
1853		Peatson, Henry Robert	Salford
1853		Pegg, Herbert	Birmingham
1853		Penney, George	Preston
1852		Penney, William	Poole
1853		Penrice, Joseph	Workington
1851		Peppercorn, Benjamin	Lincoln
1855		Perfect, George	Portsea
1841		Perrins, William	Worcester
1843		Perry, Solomon	Tavistock
1853		Pertwee, Edward	Romford
1853		Pertwee, Alfred R.	Chelmsford
1853		Phillips, John	Birmingham
1853		Phillips, Griffith	Cardiff
1852		Phillips, Edward James	Newport, Monmouth
1853		Phillips, John	Newport, Monmouth
1845		Phillips, Thomas	Wincanton
1845		Philpott, John	Bromyard
1842		Pickering, Henry	Leicester
1853		Pickering, Atkinson	Hull
1845		Pickup, Thomas Hartley	Blackburn
1841		Pickup, John	Manchester
1848		Pickup, Varey	Salford
1853		Pidgeon, Henry	Shrewsbury
1853		Pidgeon, John	Taunton
1841		Pierce, Edward Lloyd	Shelton
1853		Pilley, Samuel	Boston
1853		Pilley, John	Boston
1853		Piquet, John	Jersey
1853		Pissey, William	Rayleigh
1853		Pitts, Robert Christopher	Norwich
1853		Player, Edmund	Bristol
1842		Pocklington, James	Sydenham
1853		Pollard, William J.	Nailsea
1852		Ponting, Thomas Cadby	Bristol
1845		Pooley, John Carpenter	Bath
1854	15	Porter, William Henry	Rochester
1846		Portway, John	Bury St. Edmunds
1853		Potts, Thomas	Newcastle
1855		Poulton, John	Newton Abbott
1852		Powell, Frederick W.	Leith
1842		Powell, John	Shaftesbury
1842		Powell, Edward	Winchester
1852		Power, Edward	Walton-on-Thames
1842		Pownall, John	Salford
1841		Pratt, John	Chichester
1846		Pratt, John	Bradford
1853		Pratt, Richard Munton	Otley
1853		Priestlay, Henry	Pontefract
1841		Priestley, John	Liverpool

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1852		Prince, Henry	Taunton
1855	290	*Pring, Walter	Taunton
1855		Prior, George T.	Oxford
1842		Prockter, Richard Edgcumbe	Cheltenham
1841		Procter, William	Liverpool
1848		Proctor, William	Newcastle
1853		Procter, Joseph	Barnard Castle
1841		Proctor, William	Newcastle
1853		Prott, William	Huntly
1852	144	Prott, William, jun.	Huntly
1842		Prout, Robert	Milton Abbott
1852	327	Prowse, Charles	Bristol
1853		Pryer, William Symes	Axminster
1852		Pullin, Edwin	Northampton
1841		Purdue, Thomas	Witney
1855	355	*Pyne, Joseph J.	Manchester
1853		Quine, James	Douglas, Isle of
1851		Radford, Isaiah C.	Devonport
1841		Radley, William Valentine	Sheffield
1853		Rae, James	Stirling
1854	302	Rainey, Edward	Spilsby
1853		Ralfs, Henry Charles	Brentford
1853		Ramsay, James	Penrith
1853		Ramsey, Henry P.	Ashford
1841		Ramskill, Parson	Leeds
1841		Randall, Edward Mayor	Southampton
1845		Randall, William Brodribb	Southampton
1853		Randall, Thomas	Wareham
1853		Randleson, William	Whitehaven
1853		Ranken, James Anderson	Forfar
1848		Rankin, William	Kilmarnock
1842		Ransford, Samuel	Cleveden
1853		Ransom, William	Hitchin
1853		Ransome, Thomas	Manchester
1851		Rastrick, George T.	Geelong
1853		Rastrick, William Henry	Portsea
1842		Rastrick, Joseph Linington	Southsea
1842		Rastrick, John Alfred	Woolwich
1841		Raw, John	Preston
1853		Rawdin, Joseph	Jedburgh
1841		Rawle, William	Liverpool
1854	206	Rayner, John	Nottingham
1852		Rayner, John	Uxbridge
1853		Read, Thomas	Great Grimsby
1842		Reading, Robert Grant	Warwick
1841		Readman, William	Leighton Buzzard
1842		Redfern, John	Ashby-de-la-Zouc
1853		Redmayne, Christopher	Warrington
1853		Rees, William Henry	Dartmouth
1842		Reeve, William	Canterbury
1854	145	Reid, David S.	Anstruther
1853		Reid, David	Aberdeen
1853		Reid, John	Montrose
1854		Reinhardt, Johaan Christian	Hull

No. of Certificate.	NAME.	RESIDENCE.
	Reinhardt, George	Leeds
	Rendall, John M.	Torquay
	Reynolds, William	Halesworth
109	Reynolds, Richard	Leeds
	Rhodes, Frank	Wycombe
	Rhodes, James	Manchester
	Rich, Thomas	Weston-super-Mare
	*Richards, William	Falmouth
	Richardson, Allen	Manchester
	Richmond, Robert	Leighton Buzzard
	Righton, Job Castle	Tamworth
	Rimmington, Felix M.	Bradford
	Ritson, John	Sunderland
	Ritson, John George	Sunderland
	Ritson, Thomas	Sunderland
	Roberton, James	Manchester
	Roberts, Thomas A.	Conway
	Roberts, Griffiths J.	Holyhead
	Roberts, Charles	Westbury
	Roberts, Albinus	St. Albans
	Roberts, Edwin	Liverpool
	Robertson, James	Edinburgh
331	*Robertson, Thomas Berkley	Cullen
	Robinson, Levi	Alford
	Robinson, James Mowld	Beverley
249	Robinson, Ralph	Durham
	Robinson, Charles S.	Mansfield
193	Robinson, Benjamin	Salford
	Robson, Thomas	Brighton
	Robson, George	Durham
	Rodgerson, William	Liverpool
	Roe, Thomas	Ollerton
	Roe, William Charles	Blackheath
5	Rogers, John Robinson	Honiton
	Rogers, William	Maidstone
	Rogers, John	Ledbury
	Rogerson, Michael	Bradford
	Rome, Robert M.	Langholm
	Rook, Edward	Sittingbourne
	Rooker, Abel	Wolverhampton
	Roose, Robert	Ruthin
	Ross, Stephen	Lancaster
158	Ross, John	Kelso
	Rothwell, Jesse	Rochdale
	Rowe, John	Plymouth
	Ruffe, Frederick	Tamworth
	Russell, Thomas	South Shields
	Rust, James	Swaffham
	Sagar, Henry	Leeds
	Sanders, William H.	Bristol
	Sandiland, Robert	Bicester
	Sangster, John	Aberdeen
	Satterley, William B.	Guernsey
	Saunders, David Price	Haverfordwest

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE
1841		Savage, William Dawson	Brighton
1853		Sawer, William	Stroud
1841		Sawyer, Thomas	Ramsgate
1842		Sawyer, James	Carlisle
1853		Saxby, Henry	Lewes
1852	2	Scarrow, William	Sunderland
1846		Schacht, Frederick George	Clifton
1853		Scott, Edward	Birmingham
1856	426	Searby, William M.	Norwich
1854	239	Seath, Alexander	Dunfermline
1847		Seaton, John Love	Hull
1841		Selfe, Isaac	Bristol
1852	60	Sessions, Joseph James	Goldalming
1843		Severs, Joseph	Kendal
1846		Sewell, James	Sheffield
1846		Sewell, James Clark	Sheffield
1853		Sewell, John Holmes	Yarmouth
1841		Seyde, John F.	Willenhall
1853		Shadford, Major	Spalding
1853		Sharland, Edmund T.	Bristol
1853		Sharp, Benjamin	Warrington
1847		Sharp, Henry	Christchurch
1842		Sharp, Joseph	Salford
1841		Sharples, William	Preston
1843		Sharples, George	Preston
1848		Shaw, John	Liverpool
1842		Shaw, Charles Wright	Liverpool
1854		Shenstone, James B.	Colchester
1841		Shepard, William	Market Harboro
1853		Shepherd, James	Aberdeen
1848		Shepperley, James	Nottingham
1852		Shield, George	Arbroath
1842		Shillcock, Joseph Bradley	Bromley, Kent
1846		Shrimpton, Charles	Cheltenham
1841		Shum, Henry	Brecon
1853		Sidebottom, William	New Mills
1842		Silvester, Joseph	Knutsford
1853		Sim, James	Aberdeen
1853		Sim, George	Kelso
1847		Simmons, Frederick	Worcester
1842		Simonds, William	Boston
1843		Simpson, John	Hull
1842		Simpson, Thomas	Stowmarket
1853		Sinclair, William	Aberdeen
1853		Sincock, William	Andover
1852		Sircom, Richard	Bristol
1841		Sirett, George	Buckingham
1843		Slater, William Boocock	Blackburn
1853		Slayter, George	Reading
1852		Smale, William	Oswestry
1853		Smale, Richard Bill	Oswestry
1843		Smallwood, John Wright	Macclesfield
1853		Smart, Nevill	Littlehampton
1841		*Smeeton, Edward	Leeds

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1853		Smethurst, Richard	Salford
1853		Smith, John	Aberdeen
1853	169	Smith, William	Brighton
1853		Smith, William	Bridlington
1841		Smith, Nathaniel	Cheltenham
1841		Smith, Thomas	Colchester
1842		Smith, William	Sutton Coldfield
1842		*Smith, William	Abingdon
1842		Smith, James Russell	Woodbridge
1853		Smith, Henry	Eccleshall
1842		Smith, Henry	Edinburgh
1853		Smith, Josias	Hyde
1843	31	Smith, John	Portsmouth
1842		Smith, Alfred	Tenterden
1853		Smith, Benjamin	Cardiff
1842		Smith, William	North Shields
1842		Smith, William	Woolwich
1853		Smith, James	Haltwhistle
1853		Smyth, Walter	Merthyr Tidvil
1842		Snelling, Francis	Horsham
1841		Southall, William	Birmingham
1841		Southall, Thomas	Birmingham
1850		Southall, William, jun.	Birmingham
1842		Sowerby, John	Carlisle
1853		Sowter, William Barter	Middleton
1852		Spence, Thomas B.	Dundee
1843		Spencer, Charles	Gravesend
1842		Spencer, William	Monmouth
1853		Spencer, William Henry	Burnham Market
1853		Spencer, Thomas	Wokingham
1853		Spencer, George	Lincoln
1842		Spettigue, Joseph	Launceston
1842		Spicer, Thomas	Ilfracombe
1853		Spokes, Peter	Reading
1845		Spong, Thomas Willsden	Biggleswade
1853		Spurr, Samuel W.	Sheffield
1853		Spurr, James	York
1853		Spurr, John	York
1842		Squire, William	Hanwell
1853		Squire, William	Nottingham
1853		Squire, William	Goole
1841		Stamper, Ralph	Erdington
1842		Standring, Thomas	Manchester
1842		Stantial, John	Corsham
1842		Stanton, Samuel	Thrapston
1847		Stead, William	Wakefield
1856	291	Steel, Henry	Shefford
1853		Steel, Samuel	Beccles
1841		Steele, Thomas	Bath
1855	148	Steele, David	Edinburgh
1853		Sterriker, John	Driffield
1849		Stevens, John	Birmingham
1852		Stevens, George	Stroud
1846		Stevenson, Richard	Derby

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1842		Steward, Charles James Dale	Yarmouth
1847		Steward, William	Bridgnorth
1841		Steward, Josiah	Kidderminster
1841		Steward, Theophilus	Kidderminster
1853		Steward, John	Brierley Hill
1854	278	Steward, Alfred	Yarmouth
1841		Stiell, Gavin	Dunfermline
1853		Stoddart, William Walter	Bristol
1853		Stone, John	Exeter
1852		Stonham, Thomas G.	Maidstone
1853		Storey, Thomas	Salford
1841		Stott, William	Sowerby Bridge
1853		Strange, William Bond	Downend
1847		Strawson, Henry	Crewkerne
1853		Stuart, Henry James	Ingatestone
1842		Stuart, Charles	Woolwich
1853		Sturton, Joseph	Cambridge
1841		Sturton, John	Peterborough
1855	394	*Sturton, Richard	Peterborough
1853		Sugden, Samuel	Newchurch
1853		Suggate, Henry Ezra	Great Yarmouth
1852		Sumner, Robert	Liverpool
1853	170	Sumner, William	Birmingham
1855		Sumner, John	Birmingham
1853		Sutcliffe, William	Stalybridge
1853		Sutcliffe, James	Bradford
1853		Sutherland, John	Aberdeen
1853		Sutterby, Jonathan N.	Sutton Bridge
1853		Sutton, Francis	Norwich
1841		Sutton, Thomas	Wolverhampton
1853		Swindells, Frederick M.	Manchester
1843		Symonds, John	Aylsham
1853		Symons, William	Dunster
1854		Symons, John Netherton	Penzance
1847		Sympson, Charles	Lincoln
1852	149	Tait, William	Edinburgh
1845		Talbot, John Hind	Liverpool
1841		Tanner, Nicholas William	Exeter
1853		Taplin, Joseph	Bristol
1847		Tarzewell, Richard	Braintree
1841		Tatham, John Walkingame	Barnstaple
1852		Tatham, Leonard F.	Bradninch
1845		Tayler, William Henry	Warminster
1841		Taylor, John	Preston
1852		Taylor, John Hawarden	Preston
1853		Taylor, Thomas John	Preston
1842		Taylor, James	Manchester
1853		Taylor, Henry	Manchester
1842		Taylor, Thomas H.	Manchester
1852		Taylor, John	Wakefield
1850		Taylor, Sydney	Pendleton
1842		Taylor, Edward	Rochdale
1853		Taylor, John	Rawtenstall
1854	362	Taylor, Richard	Ryde

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1848		Taylor, John Usher	St. Ives
1842		Taylor, Thomas	Stalybridge
1848		Teasdale, Thomas	Darlington
1842		Teear, John Manshaw	Leicester
1842		Telfer, Frederick	Oxford
1853		Templeton, John	Glasgow
1842		Thomas, John Holliday	Boston
1852		Thomas, Robert	East Looe
1846		Thomas, Richard	Burnley
1853		Thomas, Morgan	Cardiff
1853		Thomas, John	Cowbridge
1853		Thomas, John	Bridge, Kent
1853		Thomas, Robert	Dover
1853		Thomas, James	Hythe
1853		Thompson, George	Alston
1841		Thompson, John	Thirsk
1846		Thompson, Edward	Otley
1853		Thompson, Henry	Norwich
1849		Thompson, John	Liverpool
1841		Thompson, James	Brentwood
1842		Thompson, Henry	Middlesborough
1853		Thompson, James	Hartlepool
1850		Thompson, Thomas	Richmond, Yorkshire
1853		Thompson, Robert F.	Sunderland
1853		Thompson, William	Sunderland
1841		Thompson, George	Liverpool
1853		Thonger, Gilbert	Birmingham
1853		Thorne, John	Bedford
1853		Thornton, John	Wedmore
1853		Thornton, Edward	Lyme Regis
1842		Thornton, Samuel	Exmouth
1853		Thurland, Edward	Oxford
1853		Tiernan, Robert	Liverpool
1853		Timothy, Thomas Norris	Reading
1841		Titherington, Thomas A.	Liverpool
1853		Tomlinson, William	Glossop
1843		Tomlinson, Charles Knowles	Lincoln
1853		Toone, Joseph Vidler	Warminster
1847		Tonge, James Scawin	York
1853		Townsend, John H.	Bristol
1842		Tozer, Richard John	Exeter
1841		Tribe, John	Chatham
1841		*Trix, John	Exeter
1852	150	Trotter, George	East Linton
1853		Troughton, James	Liverpool
1841		Trueman, William	Durham
1853		Truman, Francis C.	Jersey
1841		Tryon, William George	Portsea
1843		Tucker, Charles	Bridport
1853		Tuff, John	Enfield
1842		Tunley, John	West Bromwich
1853		Turner, Robert	Oundle
1845		Turner, Thomas	Newcastle-under-Lyne
1845		Turner, John A.	Liverpool
1853	162	Turney, Samuel B.	Cambridge

Year of Admission	No. of Certificate.	NAME.	RESIDENCE.
1853		Turton, Luke	Bradford
1853		Urquhart, John	Aberdeen
1852		Urwin, John	Bedlington
1853		Veitch, James	Dunse
1853		Veitch, William	Shildon
1845		Vincent, Philip	Fulham
1841		*Visick, Robert Goodyear	Exeter.
1842		Wain, William	Nottingham
1842		Wainwright, James	Howden
1842		Waite, Joseph	Cheltenham
1847		Walker, Edward	Newcastle-on-Ty
1841		Walker, George Clarke	Doncaster
1842		Walker, Edward Hawxby	Doncaster
1853		Walker, John Dutton	Liverpool
1842		Walker, William	Malmsbury
1853		Walker, John	Bradford
1846		Walker, William H.	Southport
1853		Walker, John C.	Birmingham
1853		Walker, Thomas D.	Liverpool
1848		Wall, James.	Tottenham
1842		Wallis, Ebenezer	Hull
1854	343	Walsh, Edward	Manchester
1852		Walsh, William	Oxford
1853		Walter, Joseph	Horncastle
1842		Warburton, Thomas	Bolton
1841		Ward, James	Falkingham
1845		Ward, James	Richmond, York
1853		Ward, Francis	Battle
1853		Wardle, William Henry	Stalybridge
1842		Warren, James	Portsea
1842		Warrior, William	Northallerton
1853		Wastnage, Thomas W.	Surbiton
1853		Waterall, George	Nottingham
1853		Waterall, George Edwards	Nottingham
1853		Waterfall, William	Newcastle
1847		Waterson, John	Birmingham
1842		Watkins, John	Stratford-le-Bow
1842		Watkins, George H.	Walsall
1853		Watkinson, Thomas	Bilson
1841		Watlock, John Dawson	Wandsworth
1853		Watlock, Benjamin D.	Battle
1846		Watson, Henry	Cambridge
1847		Watson, Edward M.	Worle
1853		Watt, James	Haddington
1853		Wavell, John	Ryde
1842		Wearing, William	Lancaster
1853		Weaver, Frederick	Wolverhampton
1853		Webb, Thomas S.	Bilston
1853		Webber, George William	Torquay
1852		Webster, Edwin P.	Newcastle-on-T
1853		Webster, Samuel R.	Warrington
1844		Welch, Charles	Nottingham
1850		Weller, George	Windsor
1842		Wellington, Frederick G. N.	South Petherton
		Wellington, James Martin	Oakham

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1853		Wellman, William	Jersey
1852		Welsh, Alexander	Dalkeith
1853		West, Henry James	Coventry
1850		West, Isaac	Oxford
1856		West, William	Henfield
1846		Westall, Richard	Ramsgate
1853		Westmacott, George	Manchester
1854	180	Wharrie, Decimus	Liverpool
1854	156	*Wheeler, Francis	Norwich
1847		Wheeler, John	Chipping Sodbury
1846		Wheeler, James Edward	Ryde, Isle of Wight
1853		Whiall, James	Chertsey
1842		Whimpray, John	Lancaster
1853		Whitaker, John	York
1853		White, Frank	Nottingham
1842		White, Robert Rowles	Dursley
1842		White, James Aitken	Manchester
1850		White, Luke P.	Peniston
1842		White, Thomas	Bilston
1846		Whitehead, Edwin	Fleetwood
1853		Whitehead, John	Liverpool
1842		Whitfield, John Lockley	Worcester
1847	16	Whitfield, John	Worcester
1846		Whitlock, Edwin	Salisbury
1853		Whittaker, William	Runcorn
1852		Whittaker, Ellis	Salford
1853		Whittle, Samuel	Leigh
1841		Whitton, George	Horncastle
1852		Whitwell, John	Thirsk
1845		Wibmer, Lewis Michael	Tunbridge
1853		Wice, Jonathan Haigh	Wakefield
1848		Wickham, William	Tunbridge Wells
1842		Wigg, John Goddard	Lynn
1845		Wiggin, John	Ipswich
1853		Wild, Joseph	Hyde
1853		Wild, David	Oldham
1847		Wilde, Eli	Manchester
1853		Wilding, William	Liverpool
1852		Wilkes, Seth Martin	Tewkesbury
1850		Wilkes, Tyers	Upton-on-Severn
1850	73	Wilkinson, William	Manchester
1854	329	Williams, Terrick S.	Birkenhead
1854		Williams, Joel D.	Bodmin
1853		Williams, William	Haverfordwest
1853		Williams, Philip	Horsham
1844		Williams, Walter	Hereford
1853		Williams, Robert	Liverpool
1842		Williams, William	Nottingham
1842		Williams, David	Pwllheli
1853		Williams, John	Leamington
1853		Williams, Edwin	Manchester
1853		Williamson, James	Edinburgh
1853		Williamson, Peter	Aberdeen
1844		Williamson, James	Hunslet
1853		Willmott, Charles	Brighton

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1855	171	Wills, Thomas D	Barnstaple
1853		Wilshaw, James	Wordsley
1848		Wilson, Robert	Berwick
1844		Wilson, Joseph	Canterbury
1841		Wilson, Charles Thomas	Swansea
1842		Wilson, Thomas	Bradford
1853		Wilson, John	Harrogate
1854		Wilson, William	York
1842		Windeatt, John	Dartmouth
1841		Wine, John	Bristol
1842		Wing, Thomas N.	Melton Mowbray
1853		Wing, Alfred	Leamington
1853		Withers, John	Reading
1847		Withers, Richard	Blackwater
1842		Witherington, Thomas	Worcester
1853		Withey, William Henry	Stroud
1853		Wood, Anthony	Arnold
1852	111	Wood, Edward	Brighton
1853		Wood, Benjamin	Halifax
1853		Wood, John Edward	Harlow
1842		Wood, William Webb	Pontypool
1842		Wood, Edwin	Abersychan
1846		Wood, Henry	Brentford
1853		Woodcock, Page D.	Lincoln
1842		Woods, William	Worcester
1853		Woodward, Charles	Ryde
1853		Woodward, William	Langport
1844		Woolley, Daniel	Stockport
1841		Woolley, James	Manchester
1842		Wooldridge, Thomas	Windsor
1854		Woolrich, Thomas	Stone
1850		Wootton, William	Wolverhampton
1853		Wrangham, Joseph	Malton
1842		Wreaks, Thomas Peacock	Glossop
1846		Wright, George Warren	Macclesfield
1842		Wright, Charles	Manchester
1844		Wright, John James	Sheffield
1853		Wright, Thomas Williams	Buckley
1853		Wright, James	Chesterfield
1853		Wright, Joseph	Ardwick
1853		Wright, William	Liverpool
1853		Wyatt, Samuel	Tottenham
1845		Wylde, James	Manchester
1845		Wylde, John	Manchester
1841		Wyley, John	Coventry
1853		Yates, George	Liverpool
1845		Young, Uriah	Cheltenham
1852	153	Young, James R.	Edinburgh
1853		Young, John	Perth
1844		Young, John	Sunderland
1853		Young, Tonkin	St. Ives
1853	224	Youngman, Edward	Bury St. Edmunds
1855	345	*Youngman, Robert	Cambridge

ASSOCIATES

ADMITTED BEFORE THE 1st OF JULY, 1842.

NAME.	RESIDENCE.	NAME.	RESIDENCE.
Baigent, William H.	London	Kitching, John	Newark
Baker, Garrard	Chelmsford	Knight, John	Cambridge
Bannick, Henry Stokes	London	Lean, James C.	Macclesfield
Barber, William Jas.	London	Lee, James	London
Baylis, Thomas	Worcester	Mackay, John	Worcester
Beaton, John William	London	Mackey, John B.	London
Bell, William	Carlisle	Mann, Robert	Newcastle
Bland, John Handel	Stourbridge	Middleton, Francis	London
Blyth, George Lindsey	Brighton	Morgan, William B.	London
Bowman, William	London	Mornement, Henry J.	London
Brewster, Godfrey W.	Cambridge	O'Reilly, William C.	London
Buss, Thomas	London	Parker, James	Bolton
Brown, Henry F.	London	Peat, William H.	Ryde
Chadwick, Henry	London	Pickford, William	Bristol
Charity, William	Alford	Radford, William	Devonport
Coates, John M.	Coventry	Risbrock, Henry	London
Cooper, William H.	Chelsea	Roberts, William	Bolton
Cowl, William	Durham	Rolph, George	Gravesend
Crispe, James	London	Sawyer, Henry	Ramsgate
Crocker, Edwin	Plymouth	Scholefield, Henry	London
Croucher, William	Shadwell	Scott, Thomas	Coleshill
Dallas, John	London	Selleck, Edward	London
Davis, David F.	Leominster	Soulby, Henry	Beaconsfield
Dobson, John	Newcastle	Steele, John W.	London
Dunn, Edward	London	Stewardson, Henry	Bedford
Ellwood, William	Carlisle	Strange, James J.	London
Fawcett, William	Penrith	Sylvester, Paul	Birmingham
Francis, George	London	Taylor, George	London
Garratt, Samuel	Cheltenham	Thompson, Morley	London
Gedge, William S.	London	Tilburn, Robert J.	Sheffield
Goodwin, John	London	Tiler, George A.	Edinburgh
Gould, John	London	Townsend, Charles	London
Grainger, E. J.	Brighton	Turner, George	Honiton
Hambrook, John B.	Dover	Walker, Henry	London
Hamilton, John T.	Dublin	Walker, William	Malmsbury
Hanbury, Daniel	London	Warren, William A.	Malmsbury
Handsley, Taylor	London	Webb, John W.	Gloucester
Hindsley, Henry	London	Wells, Frederick T. P.	Birmingham
Hingston, Andrew H.	Cheltenham	Were, Ellis	London
Holt, Isaac	Manchester	Wilkes, David	Breedon
Howden, Robert	Islington	Williams, Walter C.	Brentwood
Hunter, William	Glasgow	Wright, George H.	London
Jackson, Edward	Preston		

ASSOCIATES OF THE SOCIETY

WHO HAVE PASSED THE MAJOR EXAMINATION.

Year of Admission	No. of Certificate.	NAME.	RESIDENCE.
1850	76	Alexander, William	Peckham
1850	400	Amos, Daniel	Canterbury
1853	241	Andrews, Frederick	Clapham
1853	268	Argles, John	Maidstone
1850	410	Arnold, William U.	Thirsk
1851	419	Atkins, Ernest R.	Woolwich
1853	431	Bailey, Richard	Salisbury
1853	242	Baines, William H.	Halifax
1846	424	Barker, Matthew Mark	York
1846	14	Barkley, William	London
1854	374	Barnsby, Robert David	Tours
1853	256	Barry, Thomas	Aberavon
1847	243	Bates, James	Burslem
1853	280	Bell, Francis	Wakefield
1852	168	Bell, James	Stockport
1853	346	Bennett, Robert	Lincoln
1847	177	Bentley, Walter	Brighton
1853	322	Bishop, Alfred	Ludlow
1852	208	Blackburn, Francis	Ramsgate
1851	332	Borland, John	Kilmarnock
1853	209	Boyce, George	Chertsey
1850	272	Breton, Walter	Margate
1855	428	Brevitt, William Yates	Birmingham
1849	385	Brown, Allan M'Laren	Brighton
1853	333	Butt, Edward Northway	Newbury
1854	380	Christopher, James	Crickhowell
1853	200	Clarke, William R.	Leighton
1854	386	Clayton, George Audley	Shrewsbury
1853	281	Cleave, Charles T.	Chudleigh
1846	91	Copney, William	London
1848	367	Cotton, John L.	Barnstaple
1853	395	Cracknell, Benjamin	Halesworth
1855	432	Cross, William	Bristol
1851	351	Daines, Thomas	London
1848	377	Davies, William G.	Shrewsbury
1853	282	Davis, Richard H.	Kendal
1853	229	Duncanson, William	Glasgow
1851	352	Dyson, William B.	Wakefield
1853	324	Edman, Bonner	Lincoln
1853	258	Elsey, Charles	Horncastle
1853	368	Evans, William H.	Haverfordwest
1848	361	Fairbarn, George	Derby
1853	336	Fisher, William F.	London

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1852	160	Forrest, Richard	London
1855	421	Fouracre, Robert	Salisbury
1853	283	Freeman, William	Devizes
1850	92	Fyfe, John L.	Brighton
1850	403	Gibbons, George	Clifton
1850	79	Goode, Charles	Congleton
1849	296	Gowing, James I.	Yarmouth
1853	213	Hall, John W.	Birmingham
1853	284	Hall, Robert	Leamington
1856	434	Halliday, William J.	Pontefract
1849	404	Hopwood, Thomas S.	Richmond
1845	174	Hornsby, George	Odiham
1852	186	Hornsey, William	Edinburgh
1851	405	Jessop, John	Clapham
1850	390	Johnson, George	Birmingham
1848	382	Jones, Hugh Lloyd	Chester
1853	340	Jones, William Withers	Welchpool
1852	418	Kemp, David Skinner	Edinburgh
1853	325	Kendall, Charles F.	Scarborough
1853	234	Kinnimont, Alexander	Glasgow
1848	299	Kirkman, George B.	Clapham
1851	100	Langman, Peter	Chatteris
1849	429	Laurence, Henry	Richmond
1853	287	Lawrence, William P.	Macclesfield
1844	183	Lea, Charles Wheeley	Cheltenham
1853	310	Lewis, Thomas C.	Ironbridge
1849	406	Lingwood, James G.	Yarmouth
1852	236	Logan, Richard	Edinburgh
1854	388	Lomas, Joseph W.	London
1853	330	M'Intyre, Peter S.	Warksworth
1853	205	Marks, Edward L.	Swansea
1853	247	Matterson, Edward H.	York
1853	215	Medley, William	Derby
1842	392	Mercer, Nathan	Liverpool
1853	216	Morgan, William	Richmond
1853	217	Mousell, Thomas	Birmingham
1853	261	Mylius, Charles F.	London
1846	155	Parkinson, Robert	Croydon
1853	354	Parrott, John S.	Birmingham
1852	430	Payne, John	Leighton
1847	425	Peel, James	Canterbury
1853	238	Penney, David	Edinburgh
1853	413	Penton, Charles W.	Maidstone
1853	326	Phillips, William T.	Carmarthen
1853	301	Picnot, Charles	Rochester
1853	341	Pidduck, John W.	Bath
1845	289	Place, William T.	Knaresborough
1850	414	Player, Jacob H.	Bedford
1853	422	Preston, Richard	London
1844	248	Proctor, Barnard S.	Newcastle
1854	384	Prosser, Evan T.	Cardiff
1848	397	Radermacher, Charles J.	Glastonbury
1853	408	Rayner, William	Canterbury
1850	108	Reeve, Edward	London

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1853	251	Reid, Niel	Perth
1849	393	Robbins, John	Launceston
1848	250	Rolfe, William A.	Wokingham
1853	328	Rountree, Thomas	London
1850	415	Rowson, Henry	Chester
1853	219	Salisbury, William B.	Sheffield
1853	316	Scott, Thomas	Birmingham
1853	371	Shepherd, George P.	Canterbury
1853	188	Sidley, Insall T.	Edinburgh
1853	277	Sirett, George B.	Buckingham
1852	207	Skrimshire, Thomas	London
1853	356	Smith, Joseph	Birmingham
1842	46	Starkie, Richard S.	London
1852	147	Stathers, John	Edinburgh
1848	292	Stroud, John	Crediton
1847	33	Swann, William H.	London
1855	409	Taplin, Frederick	Bristol
1853	221	Taylor, John N.	Lincoln
1853	315	Thomson, William A.	Carlisle
1853	320	Thompson, Henry	Leatherhead
1849	372	Tibbs, Frederick	Sittingbourne
1846	61	Trask, Thomas	Croydon
1853	342	Tuck, Francis	Trowbridge
1853	222	Turner, Charles E.	Leominster
1856	427	Tyler, Henry Wing	Leicester
1848	437	Tyrrell, John W.	Norwich
1849	357	Vizer, Edwin B.	Ledbury
1844	75	Wallworth, David	Congleton
1853	266	Walmsley, Samuel	Wem
1853	253	Ward, Philip D.	Halifax
1853	398	Watson, Walker	Nuneaton
1851	114	Whitfield, Henry	Worcester
1853	423	Willett, Edmund	Brixton
1852	363	Williams, Thomas	York
1854	359	Willmott, William	Bristol
1852	152	Wilson, James	Edinburgh
1853	254	Wingate, Stephen	York
1848	172	Witt, Henry Matthew	Chelsea
1853	360	Woodcock, Joseph	Leicester
1853	255	Wortley, John	Durham
1849	294	Yarde, Giles	London
1846	223	Yates, William	Bridgnorth

ASSOCIATES OF THE SOCIETY

WHO HAVE PASSED THE MINOR EXAMINATION.

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1852	161	Applegate, Edwin	Bradford
1856	434	Arnold, Spencer	Maidstone
1850	352	Attfield, John	Walworth
1853	417	Bamber, Henry K.	Exeter
1850	393	Baxter, George	Chester
1853	407	Booth, Henry	Rochdale
1854	369	Brewer, John W. N. T.	Okehampton
1852	178	Buchanan, James	Edinburgh
1853	425	Calvert, John	Durham
1852	179	Cameron, William	Edinburgh
1853	340	Chapple, Edwin	Bideford
1851	365	Church, Henry	London
1854	344	Clingan, William J.	Edinburgh
1848	226	Coles, Ferdinand	London
1855	372	Cornell, William	Ipswich
1854	371	Cornelius, James	Clapham
1850	196	Cutting, James	Stowmarket
1856	418	Farr, Archer	Lambeth
1851	410	Ford, Charles	Reading
1855	405	Goddard, George	Lowestoff
1856	426	Green, John	Oundle
1854	385	Griffiths, Alfred W.	London
1856	427	Groves, Henry	Weymouth
1853	341	Grundy, Thomas	London
1856	428	Hayes, James	Tunbridge Wells
1856	429	Houghton, William	Warrington
1852	335	Humphreys, Richard	London
1847	56	Huskisson, William J.	London
1855	404	Harden, Charles	Bristol
1852	184	Jamie, Robert	Edinburgh
1845	406	Johnson, Benjamin M.	Collumpton
1853	396	Johnson, Joseph	London
1855	380	Jolley, Horace	London
1847	381	Jones, Thomas	Chester
1846	131	Joy, Francis William	Clapham
1853	388	Keeling, Thomas G.	Howden
1845	27	Lamplough, Thomas H.	London
1854	345	Leighton, Thomas	Edinburgh
1853	264	Lewis, Charles W.	London
1855	399	Lloyd, David L.	Caernarvon
1848	357	Long, Henry	Moorgate Street
1852	332	Long, Henry	Wigmore Street
1846	359	Longstaff, Thomas	Sunderland
1852	187	Mackay, Kenneth	Edinburgh
1856	420	Marks, Nelson S.	Cardiff
1847	148	Matthews, William	London

Year of Admission.	No. of Certificate.	NAME.	RESIDENCE.
1849	91	Miller, Thomas L.	Blandford
1849	223	Mills, William P.	Macclesfield
1853	309	Moorhouse, Stephen	Stoke-on-Trent
1848	221	Murray, William S.	Berwick
1852	190	Noble, Alexander	Edinburgh
1855	391	Nooten, Ernest Van	Edinburgh
1853	292	Ostler, Charles.	Galashiels
1853	367	Parsons, Francis H.	Southam
1853	228	Pettifer, Edmund H.	Towcester
1856	422	Reynolds, Arthur.	Watton
1853	294	Rhind, William W.	Berwick
1853	400	Richards, Charles	Weymouth
1855	412	Richardson, John G. T.	Longton
1856	430	Roberts, Owen	Pwllheli
1853	295	Rodgers, John	Glasgow
1855	388	Routledge, Henry	London
1852	395	Scott, Henry T.	Blandford
1847	336	Sewell, William	Sheffield
1853	297	Simpson, Robert	Edinburgh
1853	321	Simpson, Thomas	Walsall
1848	317	Smeeton, George H.	Birmingham
1853	268	Speechley, George	Peterborough
1852	413	Stedman, James	Lower Tooting
1853	402	Steevens, Joseph G.	Guildford
1851	364	Stewart, Charles J.	London
1856	423	Stewart, James	Kirkaldy
1853	281	Stoneham, Philip	London
1853	396	Symes, Henry T.	London
1855	383	Taplin, George	Bath
1850	326	Tasker, William	London
1853	240	Taylor, John J.	Edinburgh
1854	346	Thomson, John	Edinburgh
1853	333	Todd, Thomas	Edinburgh
1851	144	Towl, Edward	London
1849	283	Varness, Frederick	London
1849	125	Warner, John	London
1853	298	Watson, James	Montrose
1851	415	Watton, Edwar	Manchester
1853	431	West, Robert G.	Liverpool
1855	403	Williams, David M.	Truro
1856	432	Williams, Thomas	Carmarthen
1856	421	Williams, Henry Lcvi	Newport
1849	94	Wilmott, Edwin	London
1855	416	Yates, Francis	London

REGISTERED APPRENTICES.

Date of Registration.	NAME.	RESIDING WITH.	TOWN.
1853	Allingham, George S.	Mr. Dakin	Poplar
1853	Ambrose, John D. L.	Mr. Farmer	Putney
1853	Andrews, Charles	Mr. Bally	Baldock
1855	Andrews, Enos	Mr. Cropper	Long Sutton
1851	Anthony, John L.	Mr. Anthony	Bedford
1853	Aston, George G.	Mr. Grindley	Chester
1845	Aston, Thomas	Mr. Fowke	Stafford
1855	Atherton, John H.	Mr. Heath	Liverpool
1853	Atkinson, George J.	Mr. Wilson	Harrogate
1848	Atton, John T	Mr. Millns	Spalding
1852	Averill, John..	Mr. Fowke	Stafford
1851	Balkwill, Alfred P.	Mr. Balkwill	Plymouth
1853	Banks, Morris	Mr. Banks	Birmingham
1854	Barber, William	Mr. Nunn	Bury St. Edmunds
1853	Barber, Tom	Mr. King	Rochester
1854	Barnes, Edwin	Mr. Morton	Durham
1851	Bartlett, Ebenezer	Mr. Mather	Reading
1856	Barton, Frederick	Mr. Wilson	Bradford
1855	Batchelor, George H. W.	Mr. Watts	Chatham
1856	Bate, Henry	Mr. Davies	Chester
1853	Beach, Thomas C.	Mr. Beach	Bridport
1854	Beach, Wesley	Mr. Beach	Bridport
1855	Beach, Thomas	Messrs. Lea & Co.	Great Malvern
1847	Beadell, Alfred	Mr. Gilpin	Newcastle
1855	Beaton, Walter	Mr. Beaton	London
1853	Beddard, John	Mr. Cross	Shrewsbury
1853	Bell, John	Mr. Sowerby	Carlisle
1853	Bennett, George	Mr. Groves	Blandford
1855	Bennington, William	Mr. Mortimer	Sidmouth
1855	Bentley, William J.	Mr. Pryer	Axminster
1855	Berger, Volcy	Mr. Deane	Clapham
1854	Bingley, Frederick B.	Mr. Tanner	Exeter
1855	Birch, Henry C.	Mr. Clarke	Richmond
1854	Bird, David L.	Mr. Wilson.	Canterbury
1854	Bishop, William	Mr. Gay	Stroud
1845	Blaxall, Arthur S.	Mr. Blanchflower	London
1853	Blenkin, Peter S.	Mr. Lofthouse	Hull
1850	Blyth, William J.	Mr. Hurworth	York
1855	Bond, Charles R.	Mr. Medcalf	Ware
1856	Bowler, Harvey F.	Mr. Quincey	Lynn
1853	Bradfield, John	Mr. Quincey	Lynn
1854	Bradley, Edwin S.	Mr. Parker	Derby
1853	Brangan, Henry	Mr. Hewett	London
1848	Breeze, Richard G.	Mr. Dance	Fairford
1852	Brereton, Alfred H.	Mr. Green	Lee
1854	Brice, William W.	Mr. Rook	Sittingbourne
1853	Briggs, James A.	Mr. Briggs	Tipton
1852	Brocklehurst, William D.	Mr. Brocklehurst	Hyde
1853	Brown, Charles	Mr. Thorne	Bedford
1855	Brown, John	Mr. Waller	London
1855	Brown, William H.	Mr. Corder	North Shields

Date of Registration.	NAME.	RESIDING WITH.	TOWN.
1851	Brunton, Lenton B.	Mr. Mabson	Yarmouth
1851	Buckham, John	Mr. Gilkes	Leominster
1853	Burdock, James	Mr. Reading	Warwick
1854	Burton, Joseph	Mr. Wick	Sheffield
1853	Buzzard, Thomas S.	Mr. Rainey	Spilsby
1853	Cannon, John A.	Mr. Burden	London
1855	Carrington, Ebenezer T.	Mr. Toone	Warminster
1855	Cartner, David	Mr. Bell	Carlisle
1854	Chambers, William	Mr. Dresser	York
1855	Chapman, Francis C.	Mr. Green	Droitwich
1853	Chater, Edward M.	Mr. Chater	Watford
1853	Christian, John O.	Mr. Breary	Douglas
1851	Clarke, William	Mr. Parker	Birmingham
1852	Clarke, Arthur	Mr. Baker	Chelmsford
1855	Clarke, Willoughby	Mr. Brown	Oxford
1853	Cocking, Thomas	Mr. Wood	Holbeach
1851	Cocking, Samuel	Mr. Wainwright	Howden
1853	Cocking, Henry	Mr. Cocking	Ludlow
1853	Colquhoun, William	Mr. Harold	Battle
1853	Cook, William	Mr. Gamble	Grantham
1855	Cooper, Frederick	Mr. Cooper	Leicester
1853	Cornish, Thomas R.	Mr. Cornish	Penzance
1843	Cottrell, Henry C.	Mr. Fardon	Reading
1854	Coulson, Henry	Mr. Coulson	Scarborough
1855	Coulthard, Christopher	Mr. Harrison	Carlisle
1853	Coward, Edward	Mr. Morton	Durham
1854	Cozens, William	Mr. May	Reading
1854	Crease, James	Mr. Mackay	Edinburgh
1852	Crossley, Joseph P.	Mr. Greaves	Bakewell
1853	Crussell, James W.	Mr. Cooper	London
1849	Cumpsty, George	Mr. Warburton	Bolton
1853	Cutting, Thomas S.	Mr. Cutting	Selby
1852	Dakin, John	Mr. Davies	Chester
1856	Dallas, Clement	Mr. Gay	Woodbridge
1854	Dalrymple, William	Mr. Luff	Oxford
1849	Daniel, John F.	Mr. Pattinson	Carlisle
1855	Davis, Richard	Mr. Smith	Walworth
1855	Dawson, John	Mr. Goddard	Yarmouth
1855	Dean, Samuel	Mr. Fox	London
1852	Deighton, Thomas M.	Messrs. Lea & Co.	Worcester
1852	Dempsey, William	Mr. Ramsay	Penrith
1853	Dickins, Benjamin	Mr. Kendall	Stratford
1853	Down, Cornelius	Mr. Griffith	Slough
1853	Dowse, Thomas	Mr. Marks	Bradford
1853	Dowsett, Arthur	Mr. Baker	Chelmsford
1852	Drury, John T.	Mr. Harvey	Newark
1851	Dulley, Joseph	Mr. Merrick	Northampton
1852	Duncan, John M.	Mr. Lavers	Lewisham
1853	Dunn, James	Mr. Burdon	Durham
1853	Earland, William	Mr. Davies	Hay
1853	Eddowes, Ralph	Mr. Fowke	Stafford
1854	Eland, Edward F.	Mr. Telfer	Oxford
1853	Elliott, Robert	Mr. Steward	Yarmouth
1849	Else, William	Mr. Jones	Derby

Date of Registration.	NAME.	RESIDING WITH.	TOWN.
1856	Eminson, John	Mr. Marshall	Gainsborough
1856	Ereaut, John	Mr. Ereaut	Jersey
1846	Essery, William	Mr. Hallett	Plymouth
1853	Evans, William	Mr. Ferris	Bristol
1853	Evans, Edward	Mr. Bancroft	Ruthin
1852	Eyre, Joshua J.	Mr. Wylde	Manchester
1854	Fairley, Robert	Mr. Mackay	Edinburgh
1852	Fallowfield, Jonathan	Mr. Sowerby	Carlisle
1856	Farrar, William	Mr. Heming	Sunderland
1853	Fawcett, Christopher	Mr. Rowntree	London
1853	Fenhoulet, James H.	Mr. Hewett	Yarmouth
1854	Fidel, Albert J.	Mr. Telfer	Oxford
1850	Fitzhugh, Richard	Mr. Pooley	Bath
1856	Fleetwood, Thomas	Mr. Kendall	Stratford
1852	Fletcher, Thomas	Mr. Fletcher	Nottingham
1855	Fletcher, John	Mr. Henson	Camberwell
1845	Flood, William W.	Mr. Goodman	Exeter
1853	Forth, William	Mr. Headley	Bridlington
1852	Foster, Michael E.	Mr. Sturton	Peterborough
1854	Foster, Thomas U.	Mr. Weston	Sleaford
1851	Fowler, Robert J.	Mr. Harvey	Leeds
1856	Fox, Edward M.	Mr. Michell	Falmouth
1852	Frost, George	Mr. Parker	Derby
1853	Gaskell, John	Mr. Wilson	Canterbury
1846	George, Henry	Mr. Davis	Leominster
1853	Gething, William	Mr. Tomlinson	Lincoln
1853	Gill, Levi J.	Mr. Tucker	Bridport
1851	Gilliatt, William	Mr. Gamble	Grantham
1856	Goodchild, Nathaniel	Mr. Wood	Brighton
1855	Goodwyn, Charles S.	Mr. Chapman	Ipswich
1853	Graham, Ralph	Mr. Fairweather	Newcastle
1851	Green, Robert	Mr. Knott	Exeter
1855	Green, Conrad	Mr. Kendall	Stratford
1856	Green, James	Mr. Green	Bath
1855	Gregory, Richard	Mr. Lavers	London
1855	Grigor, William	Mr. Macfarlane	Edinburgh
1853	Gunn, Frederick T.	Mr. Cross	Shrewsbury
1850	Hackett, Thomas	Mr. Millns	Spalding
1852	Hall, Edwin P.	Mr. Hall	Canterbury
1853	Hall, Alfred F.	Mr. Ramsey	Ashford
1852	Halloway, John	Mr. Thompson	Carlisle
1856	Halsey, Bennet	Mr. Husband	Exeter
1854	Ham, Charles	Mr. Foster	Collumpton
1852	Hampson, Thomas	Mr. Woolley	Manchester
1854	Harley, Edward	Mr. Foster	Ludlow
1850	Harpley, Richard B.	Mr. Hodgson	Stockton
1853	Harridge, Alfred F.	Mr. Harrington	Rochford
1854	Harrison, Alfred C.	Mr. Edwards	London
1856	Harrison, Stephen	Mr. Breary	Douglas
1853	Haslam, Frederick B.	Mr. Dakin	Poplar
1853	Hayward, Charles	Mr. Tomlinson	Lincoln
1856	Head, John T.	Mr. Head	Lewes
1850	Headley, William	Mr. Headley	Bridlington
1853	Heanley, Marshall	Mr. Babington	Peterborough

Date of Registration.	NAME.	RESIDING WITH.	TOWN.
1850	Heap, Edward	Mr. Wylde	Manchester
1848	Henwood, Nicholas N.	Mr. Geldard	Plymouth
1853	Herbert, Henry	Mr. Groves	Blandford
1852	Hill, Richard	Mr. Marshall	Handsworth
1843	Hill, William	Mr. Rowe	Plymouth
1856	Hill, William	Mr. Gardner	Edinburgh
1851	Hill, William R.	Mr. Tylee	Bath
1854	Hinton, Archibald	Mr. Curtis	London
1852	Hodgkinson, John J.	Mr. Brooker	Macclesfield
1852	Holliday, Joseph	Mr. Wilding	Liverpool
1855	Holmwood, William C.	Mr. Coppock	Bridport
1855	Holt, George F. W.	Mr. Obbinson	Sleaford
1854	Horn, William	Mr. Longrigg	Appleby
1856	Hughes, Evan	Mr. Deane	Clapham
1854	Humphries, Henry A.	Mr. Grounds	Ludlow
1851	Humphries, Charles	Mr. Watkins	Walsall
1852	Hunter, George	Mr. Garbutt	Gateshead
1853	Hustwick, Thomas H.	Mr. Coupland	Harrogate
1843	Ince, Joseph	Mr. Ince	London
1856	Iverach, John G.	Mr. Iverach	Kirkwall
1856	Jackson, Warwick	Mr. Hitchcock	Colchester
1853	Jacob, John R.	Mr. Bowers	Chester
1855	Jakins, George S	Mr. Golding	London
1853	James, Daniel E.	Mr. Phillips	Haverfordwest
1853	James, Robert	Mr. Fletcher	Nottingham
1854	Jefferson, Thomas	Mr. Deck	Cambridge
1853	Jones, Charles W.	Mr. Jones	Carmarthen
1850	Jones, Humphrey	Mr. Higgins	Chester
1856	Jones, Peter Cooke	Mr. Jones	London
1853	Jones, Richard L.	Mr. Jones	Narberth
1853	Judd, William	Mr. Savage	Brighton
1855	Keene, John	Mr. Savage	Brighton
1856	Kemp, Francis	Mr. Smeeton	Leeds
1856	Kent, Frederick W.	Mr. Randall	Southampton
1851	Kent, William H.	Mr. Buck	Colchester
1854	Knight, John A.	Mr. Arnold	Norwich
1852	Laffer, Edmund H.	Mr. Fowler	Torrington
1855	Lamplough, John	Mr. Stephenson	Derby
1853	Lawrence, George	Mr. Wright	London
1853	Le Feuvre, Francis	Mr. Ereaut	Jersey
1851	Lees, James	Mr. Clarke	Richmond
1853	Leete, John	Mr. Huggins	Barnet
1850	Lenton, William H.	Mr. Foster	Hull
1853	Long, Alfred	Mr. Noakes	Brighton
1850	Longstaff, Joseph	Mr. Ritson	Sunderland
1855	Madgwick, William B.	Mr. Huggins	Alresford
1855	Malin, Edmund C. M.	Mr. Huggins	Barnet
1850	Manthorp, George	Mr. Manthorp	Colchester
1847	Marrack, George M.	Mr. Searle	Crediton
1852	Marrack, Philip	Mr. Searle	Crediton
1844	Marsh, Henry	Mr. Marsh	Biggleswade
1853	Marston, Alfred	Mr. Cocking	Ludlow
1853	Matthews, Charles	Mr. Gostling	Diss
1853	Maudsley, William	Mr. Barnes	Preston

Date of Registration.	NAME.	RESIDING WITH.	TOWN.
1855	May, Augustus S.	Mr. Greenwell	London
1855	M'Cabe, Dunbar	Mr. Macfarlane	Edinburgh
1843	Moverley, Robert	Mr. Dingley	Maidstone
1853	Nicholson, Frederick	Mr. Watts	London
1852	Nicholson, John J.	Mr. Ritson	Sunderland
1852	Nock, Thomas	Mr. Caddick	Newcastle
1856	Norrish, James	Mr. Searle	Crediton
1851	Nosworthy, Robert	Mr. Husband	Exeter
1851	Oakley, James	Mr. Wellington	Oakham
1847	Orpe, Thomas M.	Mr. Walton	Derby
1849	Ough, William	Mr. Jeffrey	Devonport
1856	Overton, William	Mr. Fowke	Stafford
1847	Owen, Thomas R.	Mr. Mease	South Shields
1852	Owles, James	Mr. Owles	Yarmouth
1856	Owles, Edward J.	Mr. Palk	Southampton
1852	Pain, Walter E.	Mr. Pain	Cambridge
1852	Paine, Standen	Mr. Paine	Brighton
1853	Parr, Robert	Mr. Wellington	Oakham
1852	Pattison, Henry	Mr. Hooper	Brighton
1855	Paxton, William M.	Mr. Mitchell	London
1853	Peacock, Hamerton	Mr. Peacock	London
1853	Peacock, Joseph	Mr. Mease	North Shields
1853	Pearce, Henry T.	Mr. Pearce	Gloucester
1853	Pepper, Adolphus	Mr. Stewart	London
1853	Pilcher, William J.	Mr. Davis	Folkestone
1855	Pitman, John	Mr. Fendick	Bristol
1853	Potter, James H.	Mr. Binnington	London
1855	Potts, Robert A.	Mr. Potts	London
1854	Power, Thomas M.	Mr. Williams	Nottingham
1854	Pratt, James	Mr. Nunn	Bury St. Edmunds
1848	Pullan, John R.	Mr. Gascoigne	Harrogate
1853	Puinlan, Joseph	Mr. Times	London
1855	Radermacher, George	Mr. Bartlett	Chelsea
1855	Rae, John Inglis	Mr. Mackay	Edinburgh
1852	Ramsay, George	Mr. Ramsay	Penrith
1853	Rawling, John W.	Mr. Oldham	Wisbeach
1849	Rees, Daniel	Mr. Brend	Swansea
1854	Reeves, Robert	Mr. Gordelier	Sittingbourne
1856	Reynolds, Freshfield	Mr. Martin	Guildford
1853	Richards, Thomas L.	Mr. Bowers	Chester
1853	Richardson, Thomas	Mr. Bally	Baldock
1852	Riley, James	Mr. Smith	Sutton Coldfield
1852	Rivers, Henry	Mr. Hornsby	Odiham
1853	Roberts, Albinus	Mr. Williams	Horsham
1853	Robinson, William P.	Mr. Edwards	Liverpool
1853	Rod, George P.	Mr. Harrington	Rayleigh
1853	Rosevear, Drew V.	Mr. Palk	Exeter
1856	Rosselloty, John C.	Mr. Couch	Islington
1850	Roulston, Benjamin W.	Mr. Chantry	Goole
1851	Roust, George	Mr. Bolton	Tenterden
1855	Rowell, Charles F.	Mr. Hope	Uppingham
1853	Rubbia, Frank	Mr. Hope	Wellingborough
1849	Ryley, Henry B.	Mr. Fowke	Stafford
1853	Salmon, Henry L.	Mr. Moore	Brighton

Date of Registration.	NAME.	RESIDING WITH.	TOWN.
1855	Sanger, William A.	Mr. Maitland	London
1853	Sarsfield, William	Mr. Leighton	Durham
1846	Savory, Thomas H.	Mr. Savory	London
1846	Savory, Charles H.	Mr. Savory	London
1854	Saxby, Henry	Mr. Saxby	Lewes
1853	Say, Edmund H.	Mr. Cooke	Norwich
1855	Scarlin, James H.	Mr. Marchant	Ipswich
1853	Serpell, Samuel	Mr. Job	Truro
1852	Sewell, Edward H.	Mr. Allchin	Islington
1853	Sheldon, Thomas	Mr. Loggin	Stratford
1854	Shepley, Samuel	Mr. Claughten	Chesterfield
1845	Shepheard, Thomas	Mr. Gulliver	Lutterworth
1853	Simmons, Jonathan	Mr. Kinch	Henley-on-Thames
1855	Simpson, Thomas	Mr. Allen	Boston
1853	Simpson, Charles C.	Mr. Goodall	Derby
1852	Sinclair, George	Mr. Gilpin	Newcastle
1854	Slater, Henry	Mr. Asling	Spalding
1849	Smeeton, William	Mr. Baldwin	Ironbridge
1853	Smith, Frank de Carle	Mr. Wright	London
1854	Smith, Frederick	Mr. Foster	Ludlow
1852	Smith, Edward	Mr. Lynch	Manchester
1845	Smith, James W.	Mr. Coulson	Scarborough
1852	Smith, William	Mr. Sumner	Birmingham
1853	Snelling, Francis	Mr. Snelling	Horsham
1852	Southall, Joseph S.	Mr. Harvey	Leeds
1855	Spearing, James	Mr. Dowman	Southampton
1854	Stanway, William H.	Mr. Blandford	London
1853	Stevens, H. W.	Mr. Hitchcock	Colchester
1852	Stokoe, Thomas	Mr. Reinhardt	Hull
1852	Stonehouse, Robert G.	Mr. Hodgson	Stockton
1855	Sturton, John R.	Mr. Sturton	Peterborough
1853	Swift, William	Mr. Judson	Ripon
1856	Tanner, Augustus F.	Mr. Dickinson	London
1853	Taylor, Frederick	Mr. Fryer	Huddersfield
1853	Taylor, Samuel	Mr. Tonge	York
1853	Teasdale, Thomas	Mr. Myers	Newcastle
1855	Teed, David	Mr. Pasmore	Exeter
1854	Thomas, George S.	Mr. Outhwaite	Bradford
1853	Thompson, George R.	Mr. Thompson	Thirsk
1853	Tollinton, Richard B.	Mr. Jackson	Stowmarket
1849	Tovey, Charles	Mr. Witherington	Worcester
1848	Toovey, Richard	Mr. May	Reading
1855	Tuck, John	Mr. Martin	Trowbridge
1853	Tucker, Henry	Mr. Kinch	Henley on-Thames
1853	Turner, John	Mr. Payne	Aylesbury
1856	Twinberrow, James R.	Mr. Twinberrow	London
1854	Twinberrow, John	Mr. Watts	London
1855	Underwood, Fred. W.	Mr. Hall	Canterbury
1855	Videon, Charles	Mr. Whitmore	London
1855	Vooght, William	Mr. Twinberrow	London
1850	Wadesley, George	Mr. Mills	Bourne
1846	Wakefield, Cecil H.		Worcester
1849	Walker, Charles	Mr. Walker	Hogsthorpe
1854	Walker, Joseph	Mr. Witherington	Worcester

Date of Registration.	NAME.	RESIDING WITH.	TOWN.
1853	Walls, Thomas	Mr. Barber	Liverpool
1856	Walsh, Edward	Mr. Argles	Maidstone
1852	Walters, William	Mr. Tanner	Exeter
1855	Walton, Ralph	Mr. Ritson	Sunderland
1856	Ward, Shaw	Mr. Lofthouse	Hull
1846	Warner, George F.		Nottingham
1852	Watson, James B.	Mr. Filt	Barking
1853	Watson, William	Mr. Chapman	Ipswich
1856	Waugh, Alexander	Mr. Randall	Southampton
1853	Webb, Thomas P.	Mr. Hollier	Dudley
1850	Wells, Edwin	Mr. Grounds	Ludlow
1853	Wheeler, James	Mr. Payne	Aylesbury
1856	Wheeler, Joseph	Mr. Owen	London
1848	Whincup, William	Mr. Coupland	Harrogate
1856	White, James W.	Mr. Iverach	Kirkwall
1856	White, John G.	Mr. Ransome	Hitchin
1853	White, William	Mr. Trueman	Durham
1856	Whitehouse, George H.	Mr. Tonge	York
1853	Whittle, Thomas	Mr. Davies	Chester
1852	Whitworth, John	Mr. Lowe	Liverpool
1850	Willcox, John	Mr. Hollier	Dudley
1853	Williams, Frederick	Mr. Anderson	Worcester
1852	Wilson, William	Mr. Rainey	Spilsby
1853	Wiltshire, Alfred	Mr. Pearce	Gloucester
1856	Witherington, Henry	Mr. Witherington	Worcester
1853	Wood, Edmund	Mr. Pooley	Bath
1854	Wood, John Robert	Mr. Simonds	Boston
1850	Woods, Edward	Mr. Corbyn	Beccles
1852	Yarrow, George S.	Mr. Fox	London
1855	Yerworth, Edward	Mr. Binge	Pimlico
1853	Young, John	Mr. Anderson	Musselburgh
1853	Young, Ralph	Mr. Gilpin	Newcastle

THE PHARMACEUTICAL JOURNAL.

VOL. XVI.—No. II.—AUGUST 1st, 1856.

THE REGISTERS OF THE PHARMACEUTICAL SOCIETY.

Some further explanation appears to be required respecting the list of embers, published in our last number. Several Members have expressed issatisfaction at the omission of their names, and consider such omission an injustice," and "founded on a narrow-minded policy." It must be nderstood that the Register of the Society is a public document, kept and aintained under Act of Parliament, and that no name can legally be placed n the register until the fees or subscriptions required by the Bye-laws are paid. he list is a copy of the register* at a particular time, and no name not on the egister at that time can appear on the published list.

The omission of the names in question is, therefore, not a matter of policy, ut necessity; and the parties responsible for it are those whose names are mitted. The remedy is in their own hands. So far as registration is concerned, hey can at any moment be placed on the register by discharging their pecuniary bligation to the Society, and they may ensure the insertion of their names in he next published list by taking care to be on the register in due time. Unless hey perform their part of the contract they cannot legally enjoy the privileges f membership or the rank of a Pharmaceutical Chemist. It may be asked, hat has the payment of a fee to do with the qualification of a Pharmaceutical hemist? It is a debt to a Society which, without such support, could not xist, and which is regulated by Bye-laws made and confirmed according to ct of Parliament. Most of the Members comply with these, which are their own aws—they are registered, and their names published accordingly. What would e the effect of a supplementary list, containing the names of those who (for ome reason not yet explained) claim exemption from the obligations, but full njoyment of the privileges, of the Society? Would such an admission be avourable to the reputation of the parties, or tend to increase the confidence of the public?

In the case of the Patent Medicine licence, the privilege is granted conditionally upon an annual payment, due on a certain day. The indulgence of a month is granted by courtesy; after which, any person exercising the privilege, unless duly licensed, is in danger of the penalty. In the Pharmaceutical Society the period of indulgence is three months, but the legal liability to the penalty exists, as in the other case, from the day the payment is due.

PROCEEDINGS UNDER THE APOTHECARIES' ACT.

Although the report of the trial at Bradford County Court was published in the *Leeds Mercury* of June 14th, we did not receive it in time for insertion in our last number. During the current month several correspondents have addressed us on the subject, expressing anxiety as to the influence of the decision in the above case on the interests of Chemists generally. The remarks in our last number were founded on information to the effect that a penalty had been inflicted on a Chemist for recommending and selling a mixture and pills, but without any particulars of the case. The report now furnished to us, and published in this number, does not alter our opinion. The defendant is not a Pharmaceutical Chemist, but an unqualified apothecary, practising without a licence. He does not even claim exemption under the broad title of Chemist and Druggist, and appeared to rest his defence chiefly on a flaw in the indictment, which being rectified, left him without any resource but that of an appeal to the passions of the jury respecting the "impertinent curiosity" of a rival apothecary, who, being legally qualified, was the instigator of the proceedings. We do not participate in the apprehensions of our correspondents as to the result of this case. It is needless to repeat what has been often stated respecting the difficulty of defining the boundary line between legitimate "counter practice," as it is called, and the practice of an apothecary. The wants of the public require that the dispenser of medicines shall know their nature and the doses usually given, and that he shall be able to give his customers information as to the use of ordinary domestic medicines in cases where medical advice is not required. The attempt to interfere with this prerogative of the Pharmaceutical Chemist by a clause proposed to be inserted in the late Medical Bill was met in the House of Commons with a direct negative. It is not the intention of the Legislature to prohibit a Chemist from administering a draught or a pill. The most intelligent and enlightened members of the medical profession do not advocate such prohibition—they know it is impossible. Such discretionary power and responsibility being thrown on the Pharmaceutist as a part of his duty, it is impolitic to twist and construe this into an absolute licence for medical practice. Persons who take such unfair advantage of the confidence reposed in their judgment, are doing an injury to the class to which they belong, and may be looked upon as a kind of jackal to the Apothecaries' Company—that is to say, they provide fair game for the lion to pounce upon.

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* Some typographical errors occurred in the list last month, which are corrected in this number. The accident arose from the re-opening of the list, after it had been finally corrected for the insertion of the names of about thirty Members, who sent their subscriptions at the last moment. It was necessary for this purpose to disarrange the type from one end to the other, and in so doing, some of the figures were misplaced.

We do not recognize Mr. Broadbent as belonging to the Pharmaceutical body, or admit that his conviction furnishes a precedent of any importance. He had no connexion with the Pharmaceutical Society, and was, to all intents and purposes, an unfledged apothecary, carrying on an extensive practice.

BRADFORD COUNTY COURT.

THE SOCIETY OF APOTHECARIES *v.* BROADBENT.

AN action was brought, in the name of the Master, Wardens, and Society of the Apothecaries' Company of London, in the Bradford County Court, on Saturday, before J. J. Lonsdale, Esq., Judge, against Mr. James Broadbent, of East Bierley, to recover the penalty of £20 imposed by the Apothecaries' Act (55 Geo. III., cap. 194, sec. 20) for practising as an apothecary without the necessary certificate. Mr. Terry, solicitor, Bradford, appeared for the plaintiffs; Mr. Shaw, barrister, Wakefield, for the defendant.

Mr. Shaw preliminarily objected that Mr. Terry must produce his retainer under seal from the body corporate; that the summons should not have been issued until that authority was produced; that, the Apothecaries' Company being the plaintiffs, the production of a mere letter was insufficient to show the authority; that the plaintiffs had not furnished full particulars of demand, pursuant to the requirements of the Court rules; and that it was a fatal error that the summons had been issued in the name of the "'Masters,' Wardens, and Society of Apothecaries."

Mr. Terry maintained that, as he was instructed by several gentlemen, whom the defendant might term common informers if he chose, as well as by the plaintiffs themselves, he was not bound to produce the authority from his clients; that it had never been done, although the Act had been in operation forty years; offered to consent to the action being brought for two penalties, viz., £40, in order to have the points taken to the Court above, or to refer them to Mr. Hugh Hill; and argued that the particulars of demand were ample, and that the word "masters" was simply a clerical error, the plural for the singular.

His Honour amended the clerical error, as empowered by the Act; ruled that the particulars were sufficient; was inclined to take Mr. Terry's view of the case, under all the circumstances, as the objection to the non-production of a sealed document was a technical one which would frustrate the intention of the Act, viz., to sue "in the name of" the Company; and felt satisfied that a common informer might sue "in the name of" the Apothecaries' Company. He therefore overruled the objections.

Mr. Terry then proceeded to examine James Tomlinson, of Parrot Fold, Tong Street, and his wife, Ann Tomlinson. The man had "a great dizziness in his head" last Christmas, went to the defendant, of whose fame he had before heard, described his symptoms, and was supplied with a box of pills and bottle of medicine, for which he paid 1*s.* 6*d.* The wife about the same time was "troubled very much with a cough," and sought the defendant's advice; he sounded her chest, gave her a box of pills and bottle of medicine, for which he charged 1*s.* 6*d.* Mr. W. Field, surgeon, happened to call to inquire the residence of a patient, saw the medicines, and was informed the source from whence they had been obtained. Martin Firth and Nancy Thorp, witnesses to prove other instances of practising, were called upon their subpœnas, but did not appear.

Mr. Shaw contended that if Mr. Terry had not proved his case as fully and satisfactorily as he ought to have done, judgment ought to be for the defendant, and that his learned friend had given no evidence to show that the defendant was not in practice prior to the passing of the Act in 1815, which would render him exempt from the penalty.

His Honour replied that the *onus* was upon the defendant to show that he did practise at that date.

Mr. Shaw argued that the act was meant to meet continuous cases, and not the case of a man who walked into a shop complaining of giddiness, and supplied with mixture and pills; or a man with a pain in the stomach, supplied with carbonate of soda and sal volatile. If it were so, there was not a druggist in England who would be allowed to escape. There ought to be more cogent evidence—there was not evidence enough to prove that his client was acting as an apothecary. He reprehended the "impertinent curiosity" of Mr. Field in Tomlinson's humble dwelling; argued that it showed the *animus*, that Mr. Field was one of the two or three common informers who got up the case, and, in point of fact, instructed Mr. Terry. Upon the whole, though there was suspicion in the case, there was a doubt, of which he called upon his Honour to give the defendant the benefit. It was not a flagrant case, and a verdict should not be given for the plaintiffs.

His Honour said, in this case he had no doubt whatever that the penalty had been incurred, that the offence was what was intended to be provided for by the Act of Parliament—that was, if he believed the evidence adduced, and there had been no attempt to rebut it, either by the defendant being put into the box or by any other course. This act was infringed day by day; and he thought it was a very dangerous thing, if a man with giddiness in the head went to an unlicensed person who gave him medicine. He knew of a man with diabetes, who got wrong medicine from an unqualified person, and expired on the spot. Then as to the common informers, any person who did so reaped a considerable amount of odium. He did not, however, so judge Mr. Field; he thought it very hard upon a medical man if he did not take up these cases; and he thought these remarks upon a gentleman who had done what Mr. Field had done were very hard and uncalled for. Verdict for the plaintiffs.

Mr. Terry observed that there were people in Court who might imagine that the defendant had been harshly dealt with; but although there were only four witnesses subpœnaed, he could have called twenty people to show that he had continuously acted as an apothecary.

Mr. Clough, the clerk of the Court, said judgment would be entered for the plaintiffs, with one payment.

Mr. Terry then asked his Honour for costs, and submitted the case of the "President and College of Physicians *v.* Harrison," in G. Barnwall and Cresswell, page 54. The question of costs was reserved by his Honour until Tuesday, the decision to apply in the case of Mr. Branson, against which the penalty of £20 was given by a jury at a former court.

On Tuesday his Honour awarded costs to the plaintiffs. The penalty in each case was £20.—*Leeds Mercury*, June 14th.

ILLEGAL WEIGHTS.

THE WESTMINSTER STAMP AND WESTMINSTER LAW.

However defective or ambiguous the law may be, obedience is a duty. It is the duty of every man to know what is lawful, and to understand, if he can, the reason why, in order that he may obey. Although the makers of the laws are bewildered with their own wisdom when reduced into legal phraseology, although those who live by expounding and enforcing the law twist and adapt it *secundum artem* to suit any case that may be placed in their hands by a client, the parties for whose guidance laws are made, namely, the public, are supposed (by a legal fiction) to be endowed with more intelligence than those whose dictum they are bound to obey, and the plea of ignorance is of no avail against the peremptory order "hereof fail not at your peril." Superhuman sagacity and pliability would be required to enable any person to interpret and obey the laws relating to the weights used by Chemists in Westminster.

In obedience to the order of the College of Physicians, sanctioned by Royal authority, Chemists are obliged to keep and use for dispensing prescriptions the weights described in the Pharmacopœia, namely, drachms, scruples and grains, and a set of weights for the dispensing counter consists of ʒij., ʒj., ʒss., ℈ij., ℈j., ℈ss., and grains from six grains down to fractions of a grain.

By the Westminster Local Act passed in 1757, and subjected to a new reading in 1856, the weights so used by Chemists in that "city and liberty" from one grain upwards, are required to be stamped with the Westminster mark. This was settled by a decision at a Court of Burgesses reported in our number for June, 1856 (vol. xv., page 529). Prior to this decision a doubt existed on the subject, and in several cases fines were imposed which were afterwards remitted, and three months allowed for stamping the weights. Such being the law, it was proper and necessary to submit. Messrs. Young received orders for sets of weights duly stamped, which they sent to the stamper for that purpose, and received the following communication :—

"Messrs. Young and Son having sent some sets of medicine weights, each set containing a two-scruple, one, and half-scruple, also a two-drachm, one, and half drachm to be stamped at this office, I beg to state I cannot stamp them with the Westminster mark, not having the standard to try them.

Thomas Cooke,
Stamper of Weights and Measures, Guildhall, Westminster."

July 1, 1856.

The present state of the law, therefore, presents the following anomaly. Chemists are required to keep certain weights. They cannot legally use them in Westminster unless duly stamped to ensure accuracy, and the stamper is unable to stamp them for want of the requisite standards. The most remarkable feature in the case is the fact that the responsibility of testing the accuracy of the weights is entrusted to a man who appears not to know that two five-grain weights (or a six-grain and a four-grain) are equal to ten grains (or half-scruple) that two half scruples are equal to a scruple, and that weights that are equal to the same weight, are equal to one another.

As the law stands, unaided by arithmetic or mathematics, it would appear that when five grains of any medicine are ordered, accuracy is of the highest importance, but not so when a scruple or a drachm is required. The other horn of the dilemma is the inference that scruples and drachms are henceforth illegal weights, and that when two drachms are ordered in a prescription, twenty six-grain weights, or twenty-four five-grain must be used. When a new interpretation of an old law involves so palpable an absurdity, there is no remedy for it but a return to the old interpretation, or the passing of a new Act. Until one of these courses is adopted, Chemists must lay aside their scruples, and use drachms at their peril.

THE PROGRESS OF PHARMACY IN BIRMINGHAM.

We have attended some interesting Pharmaceutical Meetings in Birmingham. There was an evidence of a desire for improvement—a tendency to progress, which may be observed in other institutions in that city. A regret was expressed at those meetings that the attendance was not so numerous as it might have been, but this was accompanied by a hope that the number of supporters would increase as the value and importance of the Association became more generally known, and that the rising generation would avail themselves of the opportunities afforded for the advancement of Pharmaceutical education. This hope has not yet been realized. The Association, instead of increasing, has suffered under a process of spontaneous evaporation, until it ceased to exhibit any signs of vitality. The loss of the local Secretary, who had taken a very active part in the proceedings, and whose removal from Birmingham to London deprived the Association of its mainstay, was severely felt, and his place was not immediately filled by a successor having the same tact and energy in the performance of the duties of the office. Thus the Birmingham Chemists' Association gradually acquired a latent state—it ceased to be enumerated on the list of local Associations, and was supposed to be defunct. All institutions are liable to these fluctuations, and it not unfrequently occurs that the seeds of vitality remain, although for a time no outward and visible sign of life is manifest. This we are glad to find has been the case with the Birmingham Chemists' Association, which is about to make a fresh effort to renew its strength and resume its activity, as will appear from the following communication from Mr. George Johnson, the Honorary Secretary:—

"While the Pharmaceutical Societies of Edinburgh, Liverpool, and Manchester are constantly contributing to your Journal interesting particulars of their Meetings and Transactions, the Birmingham Pharmaceutical Association has for a long time communicated no account of its condition or operations. This silence has not arisen from a disposition on the part of our Committee to withhold from circulation among the members of the Pharmaceutical profession anything that might be useful or interesting to them; but from the fact that nothing of this kind has for a long time transpired in connexion with our Association. Rather more than twelve months ago it was reported in the *Pharmaceutical Journal* that in consequence of the difficulty of obtaining professional lecturers, and the small attendance at lectures delivered by our own members, and also at the conversational meetings, we resolved to give them up for the ensuing season. The diffusion of information by means of the Library was thus the only one of the operations of the Society which remained, and upon this consideration the amount of subscription was considerably reduced.

"At the last annual meeting several members present expressed a wish that some effort should be made to resuscitate the Society, and some discussion followed as to the best means of effecting that object. Mr. Bird then stated that he had attended two lectures of the course on Chemistry then being delivered by Mr. Williams at the Midland Institute, and from the opinion he had formed of their excellence and adaptation to the wants of our Society, he strongly recommended that we should procure tickets for the ensuing course for such of our members as would attend it. At the next Committee the subject was more fully discussed, and it was resolved, if possible, to prevail upon the Council of the Midland Institute to give us a course of morning lectures on Chemistry, as it was thought that probably more young men might attend them than if they were delivered in the evening. This was attempted; but the Council of the Institute did not wish to depart from their general plan, and we were obliged, as our only resource, to attend their usual evening lectures. A canvass of the members and others was accordingly made, and the result was the disposal of twenty-six tickets. These were renewed quarterly during the continuance of the course, but unfortunately at the close of the first quarter, during which the attendance of our students had averaged sixteen or seventeen, many of them declined to renew their tickets, so that the attendance has fallen off. It was the intention of our Committee to have given a prize to the best student at the end of the course; but the lectures have been interrupted by the Institute at the end of the second quarter, and if they are resumed, it will not be before the beginning of next year. When the above plan of obtaining lectures was adopted, it was hoped that the Assistants and Apprentices of the town would avail themselves of the opportunity thus afforded them of studying a science so indispensably needful for the intelligent performance of even the ordinary operations of their business, and the number of tickets sold for the first quarter seemed to justify such a conclusion; but the excitement proved to be only a temporary one, and it again subsided in too many instances into indifference.

"It is but fair to state, however, that many, if not most of the instances of withdrawal were occasioned by inability to attend. Another cause for regret, is, that some who had been formerly active supporters of the Society, and who, from their position and experience in practical and scientific Pharmacy, were well calculated to promote the interests of the Society and the improvement of its Members, have withdrawn not only their influence, but even their subscriptions.

"We cannot afford, on this account, to hire a room even for the accommodation of our books, all our subscriptions being required to purchase new ones. We have recently arranged with a bookseller to take the custody of our library, free of charge, upon the condition that we purchase all additions to it from him.

"It is a lamentable fact that every public scientific society in Birmingham, sooner or later, comes to nothing, and that in so large and wealthy a town a sufficient number of men in our profession cannot be found to support a society (with credit) which is so greatly adapted to promote their mutual interests and respectability.

"Our Committee would be obliged by the insertion, at your discretion, of the whole or a part of the above in the *Pharmaceutical Journal* for next month.

"*Birmingham, July* 19*th*, 1856."

THE LIMITED LIABILITY MANIA.

The mania for limited liability continues to increase. Penniless adventurers are going about like roaring lions seeking whom they may devour. "Sappers and miners" are preparing traps for the unwary, and prudent men who have something to lose are beginning to button up their pockets. As this latter class constitute a very small proportion of the community at large, they have no power to stem the torrent of popular frenzy which will be let loose when the flood-gates of speculation are opened, as they will be as soon as the propulsive force of the Act has had time to acquire its destined momentum. In our number for March (vol. xv., No. 9) we described briefly the tendency of the principle involved in the Act, with illustrations showing the reciprocity of mischief which must result from it if indulged in without restraint, and applied generally to commercial undertakings. If we may judge from the schemes already commenced or projected, there is scarcely any trade or business which is not liable to be crushed by the unnatural weight of limited liability. Among other projects there is a Shoemakers' Company, the professed object of which is to make boots and shoes by the aid of machinery, at a rate so much below the ordinary charges as to command universal patronage. The name of a distinguished Alderman of the City of London has been mentioned as Chairman of the proposed company, of which a provisional prospectus has been printed, with the word "confidential," for private circulation. Such documents being sometimes issued as "feelers," without the authority of the parties whose names are provisionally inserted, it would not be right to expose them until the word confidential is removed from the document, but we may direct attention to the class of persons against whom this scheme is levelled, as an average example of the operation of "limited liability," when placed in competition with fair trading. The business of a shoemaker is one which affords an honest living for a very numerous class of persons, some of whom are men of substance, but a very large majority derive a scanty income from their daily toil, and belong to the humbler ranks—or, in popular language, "the industrious classes" of society. With small capital and much labour the shoemaker carries on his trade. He is not protected by limited liability, but is liable, to the extent of his last shilling, for any debts he may incur, either in the ordinary course of business, or in his family expenses. If he is to compete with the new company he must reduce his profits, already barely sufficient (on the average) for his necessities, his liabilities continuing the same as before; while the shareholders of the company are not liable to pay their debts unless they happen to have a sufficient balance at their banker's. If the company should fail, after having ruined the trade by an unnatural reduction in the market price of the commodities which are the subject of competition, the creditors have no remedy beyond the limit of liability to which the shareholders have thought proper to subject themselves. If the company should fulfil its promises, and carry off the lion's share of the trade, the regular tradesmen, whose liability is not limited, must pay their creditors as long as they have wherewith to pay, and then retire to the workhouse. This, we may be told, is not a necessary result, for if one trade fail, others may be tried. Be it so. Let the ruined shoemaker go to school again and learn another business; let him succeed and prosper by some good fortune scarcely to be expected, and he must be prepared for a repetition of the same disaster. As long as the limited liability mania prevails, no business or calling is safe from attack, except such as are known or supposed to yield no remunerative return; and *success in any branch of industry* will be the signal for the formation of a new company (limited) to absorb or destroy the benefit. No sophistry can disguise the fact, that a competition in which one party is protected by "limited liability," and the other not so protected, is an unfair and unnatural competition, fraught with evil and injustice. Among the trades enumerated in a return to Parliament of the companies formed under the Joint-Stock Companies' Act of last year, a few examples may be amusing:—

Soap and candle makers; Scotch Manchester Silk, Woollen, and general London Warehousemen; Cask makers; Millers; Flax, straw, and paper manufacturers; Drapers; Money advancing Company; Glass bottle Company; National Opera Company; Fishing Company; Fire-arms manufactory; Sacred Harmonic and Vocal Music Company; Fish manure Company; Company for maintaining residences in which an equality of temperature can be preserved, suitable to delicate constitutions; Bath Company; Lending money; Brewing, Wine, and Spirit Trade; Washhouses; Company for purchasing reversions, life interests, &c.; Brewing and malting; Brick-making; Publication of law reports; Purchasing and selling Wines and Spirits; Supply of Newspapers; Cotton spinning; Manufacturing articles in Iron and Brass; Hotel Company; Omnibus Company; Pottery-ware manufactory; Fuel manufactory; Patent graining Company; Working bell-metal, tin, copper, &c.; Electro-plate and works of art Company; Catching and curing Fish; Corn-factors, millers, and bakers' Company; Imperial Hotel Company, Trafalgar Square (on the site of the Royal Academy, when they can get it!); People's club Company; Company for Curing cattle and pigs for the Army and Navy; Church-building Association; Coachmakers' Company; Plane makers' ditto; Tea ditto; Linen-washing ditto; Exhibition of Pictures; Manufacturing and selling Food; Anchor Company; Bending wood; Refining sugar; Prosecuting the herring, mackerel, and other fisheries at Great Yarmouth; Receiving money on deposit, &c.; Publishing books; Purchasing the river LARK, and trading thereon!

It may be said, the public good is the primary object to be attained, and the interest of classes must yield to this general principle. We have hitherto dwelt on one side of the picture—namely, that of the parties competing with joint-stock companies. There are other parties whose interests demand consideration—namely, the creditors and the shareholders of such companies, who may be fairly taken to represent that portion of the public not comprised in the several trades injured by the competition.

This view of the case may be made obvious by an example showing the rise and progress of the kind of scheme which the existing facilities for speculation are calculated to encourage. A provisional prospectus is printed—"*Magnus*," chairman; "*Brown*, *Jones*, and *Robinson*," provisional directors; "*Sharp*," solicitor; "*Crib*," secretary. The projectors allot the bulk of the shares to themselves in the first instance at a nominal price or on credit, a few being privately offered to personal friends at par as a great favour. A prospective balance-sheet, showing a large dividend, is published, with the announcement that the shares are already at a premium, and this hypothesis is verified by the fictitious sale by the directors of a number of shares to each other at an advanced price. As soon as the public appear disposed to swallow the bait the shares are allowed to ooze out by degrees, care being taken not to glut the market, and to buy up a few occasionally to keep up the price. The concern being launched, purchases are made, liabilities incurred, offices and all the requisites for business provided. In due time Brown, Jones, and Robinson, having sold their shares, retire from the direction. Magnus also retires; Sharp obtains a settlement of his account, and limits his liability to the amount of the small number of shares required to qualify him for his office. The secretary initiates the new directors into the mode of dulcifying accounts to satisfy the shareholders, and they keep the game alive as long as they can by paying dividends out of capital, until some shareholder, more awake than his neighbours, discovers that the concern is not so flourishing as it had been stated to be. A vigorous effort is made by infusing new blood in the direction, and by strict economy, to realise a profit; but with only partial success. The panic arrives at last. The creditors of the company receive such a dividend as the liability of the shareholders enables them to get; the shares change hands repeatedly during the process of settlement, the price gradually going down to nothing. This is not at all an exaggerated description of the schemes which, even under the old law, rise like mushrooms during a period of speculative excitement. What then may we expect to be the result of a new law, affording unprecedented facilities for extending the principle of joint-stock companies to every department of trade, wholesale and retail?

It may be instructive to give a few specimens of the class of persons for whose peculiar talent the mania for speculation affords a congenial field for enterprise. Examples may be found in connexion with Pharmacy which, in common with every other line of business, is liable to be drawn into the vortex of "limited liability." We may imagine the case of a medical man, unknown to fame and in need of practice, opening a Chemist's shop in a small country town. He forms the nucleus of a business, which he advertises for sale, with the usual encomiums, and succeeds in disposing of it to advantage. The purchaser, after a few months of constant application, finds the returns fall short of what he expected, and considers the business is not worth half the price which he has paid for it. When he visited the establishment by appointment prior to the purchase, it *happened* that there was a constant influx of customers—an appearance of a steady retail and dispensing trade. This was confirmed by entries in the day-book and ledger. But no sooner is the money paid and possession taken, than the shop is comparatively deserted, and the bonâ fide extent of the business manifest. He complains to the vendor, who, after some explanation and discussion, re-purchases the business at a considerable abatement. Another purchaser is found, "let in," and "let out" in a similar way—the vendor clearing a good round sum by the transaction. A horse-dealer will sometimes make a regular income by a jibbing horse, selling him and buying him back at a discount, until the profit amounts to several times the value of the horse; but this mode of proceeding in the sale of a business injures its character, and cannot be often repeated. The game having been played out, and the shop finally disposed of, we may imagine the same talent and experience bestowed on another speculation in a different locality, on a more extended scale, under the auspices of the Limited Liability Act. If the projector of the undertaking should require a colleague, he would be fortunate in meeting with a gentleman whose name we need not mention, but whose antecedents are such as eminently to qualify him for the part he has to play. He formerly held a responsible situation in a public institution, where he so skilfully turned his official authority to account, that he almost acquired for himself a "local habitation and a name" for life on the premises of the institution. This arrangement, however, was not satisfactory to the committee and proprietors, and a trial of strength ensued, which, after a feeble exhibition of physical force on one side, and legal talent and persuasion on the other, resulted in the loss to the institution of the valuable services of its active and enterprising secretary. It could be no matter of surprise that two talented individuals such as those above described should become united like David and Jonathan in the laudable endeavour to teach their fellow-men honesty and fair dealing, to serve the public with purity and wisdom in the dispensation of medicines, undertaking to sell everything under its own proper designation, without adulteration, sophistication, or substitution, and to realize for the shareholders of a joint-stock company (limited) a very comfortable dividend.

From the circulars and advertisements issued by a company of persons professing to be benefactors of mankind, we learn that they alone are able and willing to test and ensure the absolute purity of drugs and chemicals, or to protect themselves from purchasing worthless medicines. We are informed that they scrutinize everything, test everything, offer to the profession and the public precisely what they intend to purchase in a state of purity, while from other people may be expected some cheaper and comparatively worthless *substitute.* Extracts from the evidence of the Parliamentary Committee on Adulteration, culled and trimmed with nice discrimination to suit the purpose intended, are placed in juxta-position with the laudatory comments on the integrity and skill of the advertisers. The contrast is very striking, as a specimen of self-praise and slander, chemically combined. The authenticity of the self-praise needs no comment, for what can be more authentic than a man's description of his own qualities? The slander contains a few truisms, copiously diluted with fiction, and artificially coloured.

Among the persons whose names are prominently connected with companies formed to supply the public with pure and genuine medicine (and of such companies we have heard of several), we may mention one who has been in the drug trade many years, has changed his locality several times, but has never been successful. Two others, also Chemists and Druggists, who have been in the *Gazette*, paying very small dividends to their creditors, are now, we are told, about to manage the affairs of a company so cleverly as to pay large dividends to the shareholders. A person formerly a hatter, at another time a collar and stock maker, who has failed twice but paid no dividend, is also mentioned as one of the active promoters of a proposed Medicine Company (limited). The reverses of the unfortunate may excite sympathy and compassion, but the eligibility of such persons to manage the affairs of others is questionable.

On looking over the Parliamentary return above mentioned, we find that many of the parties whose names are down as directors are stated to belong to trades or professions having no reference whatever to the objects for which the companies with which they are respectively connected are formed, and therefore, it may be inferred, not likely to have had practical experience in the duties they have to direct or discharge. In one company a regulation exists prohibiting any person in the business the company is to carry on from being on the direction, or even holding shares: consequently the managers and proprietors are all amateurs, who rely for success on the well-known proverb, that "every man understands the business of other people better than his own."

A peculiar feature in these new companies is their exemption (according to prospectus) from the frailties and fallibilities of human nature. Even a Judge may err in judgment, and a new trial may be granted on the ground of "misdirection;" a Physician may be mistaken in his diagnosis, or an oversight may occur in a prescription; we are told that the foreign producer, the merchant, the manufacturer, and drug-grinder deteriorate or adulterate their articles in a manner almost to defy detection. But the infallible companies (limited) are not liable to these casualties; the integrity displayed, the skill exerted, and the means employed, afford to the public a guarantee of absolute perfection. To what extent these professions are practically carried out, we have some means of judging from circumstances which have come to our knowledge. The following extract of a letter from a correspondent is a specimen:—

> "The profession and a portion of the public have lately been besieged with circulars, emanating from a certain trading company, '*limited*,' in which, amidst general abuse of existing pharmaceutists and special laudation of themselves, occur these two passages :—'Dispensers of medicines themselves must be deceived, or at least at all times unable positively to determine the nature of the substances they employ.' But—'they (the said company, 'limited') have engaged the services of scientific chemists, to subject to the strictest testing and analysis every substance they sell, and for preparing with scientific accuracy all compounds.'
>
> "Being recently in London, and having occasion for a little Liquor Potassæ, I procured some at this new Hall of Purity, innocently expecting it to be perfect. But, being a 'dispenser of medicines,' I weighed a portion, and found its sp. gr. to be 1.072, and though not a professed 'scientific chemist,' I added a little dilute hydrochloric acid, and it effervesced like a Seidlitz powder."

The opinion which we have formed as to the tendency of the limited liability mania is not unsupported by high authority. Since the publication of our first remarks on the subject, we have seen in the reports of debates in the House of Lords several passages which strongly confirm our views of the case.

In the discussion on the Joint-Stock Companies' Act, June 16th, Lord Overstone, in presenting petitions against the measure, said—

> "It surprised him that the principles of free trade should be supposed to have any bearing upon this Bill, and he trusted there would be no reference to these principles in the course of that evening's discussion; but if there were, he hoped Her Majesty's Government would have the goodness to explain how it was that they reconciled it with freedom or with economy, to introduce a measure which gave the privilege of limited liability to bodies of persons seven or more in number, while they withheld it from smaller associations of individuals, thereby holding out a great inducement to the transfer of concerns now carried on as private concerns to joint-stock companies. Perhaps the Government would also have the goodness further to explain how it was, if the principles of this measure were of such value, and were worthy of universal application, that they excluded from the operation of the Bill all companies engaged in banking or insurance."

In a petition from the Trade Protection Society of Liverpool the unfairness of the competition between parties engaged in trade on their own responsibility and companies formed under the proposed Act, was explained, and the injustice of the measure pointed out.

Lord Monteagle, in reply to Lord Stanley of Alderley, who moved the second reading of the bill, unequivocally condemned the principle of it—

> "The noble Lord said this Bill was especially for the benefit of small capitalists and traders. On the contrary, he (Lord Monteagle) believed that there was no class of the community likely to suffer so much from a Bill of this description as the humbler classes, who might be induced to enter into speculations over which they would have no means of exercising control, and who would be made the dupes of designing parties. All kinds of companies would be framed, and though such companies might be unsuitable for ordinary trade and manufactures, there was one thing which they would be fitted for, and that was to manufacture shares and to encourage a spirit of gambling. He was told they were not to protect people by Act of Parliament; but that was not an accurate mode of stating the case. He would rather say they were not to ruin people by Act of Parliament. He apprehended mischief from the Bill, and therefore he entreated their Lordships to hesitate before

they gave sanction to a measure that was not wanted for the legitimate trade of the country, and which would be detrimental to those engaged in it."

* * * * *

"Had such a legislative monster now before their lordships been produced in America, in France, or in any other part of the world? He asked the House to consider the disadvantages this measure—upon which his noble friend relied for the development of trade and commerce in this country—would entail upon persons who encountered the risks of ordinary trade. Mushroom companies would be established under the auspices of gentlemen learned in the law, and he feared the term 'limited liability,' instead of being regarded as an indication of danger, would rather operate as a bait."

On a subsequent occasion, June 24th, Lord Overstone in Committee (on clause 18)—

"Appealed to the Government whether it were the proper course for Parliament to pursue to say that they would do nothing for the just protection of the public, but that every man was endowed with some amount of discretion, and that he must take care of himself, and guard himself from the pitfalls which surrounded him. After referring to Lord Ashburton's description of what had occurred in 1825, the noble lord contended that similar results might be anticipated if the House persisted in sanctioning this measure; and he warned their lordships that when the crisis arrived —as it might do even in a more exaggerated form than then—it was not the imprudent, the rash, and the foolish only who would suffer; but that the innocent, and even the careful, would be necessarily drawn into a vortex from which they could not escape.'

The opposition which has been raised against the extension of the speculative principle has caused some modification in the bills relating to the subject which have been before Parliament. We have not attempted to follow in detail the course of the arguments, or to explain the bearing of the several clauses in the Joint Stock Companies Act which is now passed, and the Law of Partnership, which is connected with the subject. Our object has been merely to point out the tendency of the prevalent disposition to afford increased facilities for speculation, and the endeavour to remedy an evil by running wild into the opposite extreme.

THE LEEDS POISONING CASE.[*]

We shall not attempt to give a report of this trial, too much of our space being already devoted to strychnia, and a brief notice of the leading facts being sufficient. It was proved that the prisoner for some time previously to the decease of his wife, was on bad terms with her, often abusing and even assaulting her; that he was in the habit of getting drunk, and his conduct was so violent, that a separation was arranged with an annual allowance, but by the intervention of some friends they became reconciled. In consequence of threats that he would do for her, give her a pill, and other similar expressions, Mrs. Dove was under some apprehension, and said to the servant, "Mind, if I die, it is my wish to have my body examined." On the 24th of January, Dove having read the account of the inquest on Cook, with the fact that strychnia could not be discovered in the body, applied to Mr. Harrison (pupil of Mr Morley) for some strychnia, to kill cats and mice. He made some significant remarks about the difficulty of detecting strychnia after death, and alluded to Palmer's case, pointing out in the surgery the antimony bottle. Ten grains of strychnia having been given to him, he did not attempt to conceal the fact, but placed some on meat, &c., which he laid for the cat, and also for a mouse, both of which were killed. On another occasion he was detected in Mr. Morley's surgery alone, and he knew where the poison was kept. He also received shortly afterwards five grains more of strychnia, stating that most of that which he had before was wasted, and he was infested with wild cats.

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[*] Trial of William Dove, Crown Court, York, before Mr. Baron Bramwell, July 17th.

On the 16th of February he described to a neighbour the effect of the poison, saying it seizes them in the back, and they die instantly. On Tuesday, the 25th of February, Mrs. Dove was, soon after breakfast, seized with spasms in her limbs and back, the symptoms resembling poisoning by strychnia, which, however, was not at that time suspected. On Wednesday, Dove asked Mrs. Witham, a neighbour, to go and see his wife, saying she was very ill. The next day he wrote to Mr. Morley, who was in attendance, saying that he had full confidence in him, and did not wish for other medical advice, but wished him to speak to his wife on religious matters. He usually gave her the medicine himself, and always washed the glass afterwards. The reason he assigned was, that the medicine was so nauseous. Mrs. Dove complained sometimes that it was very bitter. On Thursday, Mrs. Dove had another attack, and her husband wrote to her mother. He also expressed the opinion that she would sink under one of these shocks, and told Mr. Morley, in case of her death, he objected to a *post mortem* examination, as he said she had an objection to it. On Friday, he requested Mr. Sturgeon, a clergyman, to talk to his wife on religious matters. That afternoon he gave her some medicine, and on going out of the room, pretended to shed tears. He said his wife would have another attack at half-past ten, which was the case, for at ten o'clock he came home, and gave her some medicine. About one the spasm subsided, and in the morning she appeared to have recovered. In the afternoon he went for some beer to a public-house, and said his wife would not recover. About eight he came in rather tipsy and excited, and gave her some medicine. At half-past eight she had another attack, cried out, "Off the bed;" one paroxysm succeeded another, and she died in the greatest agony at twenty minutes to eleven. The prisoner came in soon after his wife was dead, and strongly objected to having the body examined. He was advised to leave the room, and he went to a public-house, had two glasses of brandy-and-water, and said his wife was dead. About twelve he went drunk to Mr. Hicks, who brought him home. He at that time repeated his objection to the *post mortem*. The same night Mr. Morley mentioned the decease of Mrs. Dove to Mr. Scarth, his assistant, who immediately recollected the poison, and told him that he had let Dove have some strychnia. Mr. Morley then suspected the cause of death, and insisted on a *post mortem* examination. On Monday, the 3rd of March, the prisoner wrote to him:—"Dear Sir,—It is very harrowing to my feelings, the idea of one I loved to be cut open, particularly as she so strongly requested not to be. Do you cast any *blame* on me for anything I have done or not done during her sickness? If you do it, you do it on your own responsibility. An answer will oblige. Yours, &c."

On the 4th of March, Dove made some observation about his wife's wedding-ring, and said, "You cannot but think I shall marry again." He also requested his neighbour, Mrs. Witham, to allow him to visit her. She objected, saying the neighbours would talk. On Wednesday night he saw his wife before she was put in the coffin. He kissed her, and said, "So teach us to number our days, that we may apply our hearts to wisdom." After this he saw Harrison, and said, "Can they find a grain of strychnine in the body?" Harrison said, "Have you given your wife any?" He said "No, but some might have been spilt." He also made several remarks about different poisons, and the difficulty of detection. Forty-eight hours after death the body was examined. The muscles were stiff, back arched, eyes protruding, a peculiar expression of distress on the countenance. All the chemical tests applied showed the presence of strychnia. Besides which, enough of the poison was extracted from the contents of the stomach to test its action on animals. A mouse died in eight minutes; a rabbit in fifty minutes; a second was convulsed but recovered; a guinea-pig died the next day. The animals which died had all the spasms and twitchings usual in poisoning by strychnia. After the funeral, a person who went to clean the house had a spaniel, which licked some blood that had been spilt on the floor. On the way home the dog was seized with spasms and died. The trial occupied three days, and the evidence of poisoning being conclusive, as well as the evidence implicating the prisoner, the chief point relied on in the defence was the alleged imbecility of his mind. That many of his actions were inconsistent with the usual symptoms of a sound mind, could not be denied; but whether this arose from drunkenness or weakness of intellect, might admit of some doubt. At all events, if the plea of insanity is to be received in such a case, no murderer would have any difficulty in evading the law. The learned judge, whose summing up occupied six hours, very clearly stated the questions to be considered by the jury were, whether the deceased died from poison? whether the poison was administered by the prisoner? and if so, whether his intellect was so weak that he was not conscious of what he was doing, and the consequences?

The jury retired, and in three-quarters of an hour returned with a verdict of guilty, but with a recommendation to mercy, on the ground of the prisoner's defective intellect.

His Lordship said the jury had done their duty in returning a verdict of guilty, and had yielded to the natural impulse of pity in recommending the prisoner to mercy, which would be forwarded to the proper quarter; but he would not hold out any delusive hopes to the prisoner, on whom he passed sentence of death in the usual form.

THE SALE OF POISONS.

The frequent occurrence of any particular crime naturally gives rise to serious reflection as to the state of the law with reference to prevention, detection, and punishment. The crime of poisoning has become a scientific art or profession, and while science has afforded increased facilities of detection, the advancement of such knowledge with the details of each case has been equally available to the criminal, by placing him on his guard, and suggesting means of eluding discovery. Even where the circumstances of the case leave no reasonable doubt as to the guilt of the accused, there may be much difficulty in obtaining such evidence as to be in a legal point of view sufficient to ensure a conviction, and bring the offender to justice.

It is, therefore, of great importance to consider whether any means could be adopted for the prevention of this increasingly prevalent crime, by some precautionary regulations respecting the sale of poisons. This subject has been discussed in both Houses of Parliament, and the following allusion to it occurred in the House of Lords, on Thursday, July 10th:—

Lord Campbell rose to put a question to his noble and learned friend on the woolsack upon a subject of great importance. He would not now advert to the facts which had been disclosed during the trial of a recent case which had occupied the attention of all Europe, but he was shocked to say that for several years past the crime of poisoning had become remarkably common, and in his opinion some new law was imperatively required for the regulation of the sale of poisons. Many crimes of that kind had been caused by the institution of burial societies, the members of which had, in several instances, been proved to be accessory to the death of their own offspring. Another class of those cases arose out of the present system of life insurance. Persons caused insurances to be effected on the lives of others in whom they had really no interest whatever, with the premeditated intention of committing murder; and he knew from his own experience that murder was frequently committed in consummation of that intention. Until lately no restriction whatever had been placed upon the sale of poisons; it was possible to purchase arsenic as easily as Epsom salts, and the consequence was that cases of poisoning by arsenic became alarmingly common, especially in Essex and Norfolk.

By a Bill introduced by the present Lord-Lieutenant of Ireland, a check had been put upon the sale of arsenic. That poison was now therefore out of fashion, but another poison, nux vomica, had taken its place. Any one might go to any chemist's in England, and buy a pennyworth of nux vomica by merely stating that he intended to use it for the purpose of poisoning rats. Nux vomica, although not as powerful a poison as strychnine, produced the same fatal effects; but even strychnine might easily be procured. In some places people were not allowed to bathe, except with a rope round their waists. That was carrying precaution to an extreme, but there certainly ought to be some restraint placed upon the sale of poison. Of course he could not expect any new measure to be introduced during the present session, but he hoped his noble and learned friend would take into consideration the expediency of bringing in a Bill on the subject as soon as possible.

Lord Ravensworth suggested that it would also be desirable to make some new regulations with regard to insurance societies. Whenever any suspicion was entertained as to the cause of the death of a person insured, the company entertaining such suspicion ought to be obliged to communicate the facts of the case to the Home Office, in order that an investigation might be made by the authorities whose duty it was to protect the lives of Her Majesty's subjects.

The Earl of Donoughmore complained of the course which had been taken by the noble and learned lord in putting his question, which stood at the end of the orders of the day, during the first quarter of an hour after the sitting of the House, the time devoted by their Lordships' regulations to the reception of petitions. He hoped the noble and learned lord on the woolsack would not answer the question until the orders had been gone through.

The Lord Chancellor said, as a noble lord had made some observations on his noble and learned friend's question, he thought he should be justified in answering it. The result of the investigation entered into by the Government five years ago was, that the measure then introduced was confined to arsenic. He understood that difficulties of a serious nature presented themselves in defining the different sorts of poisons, but he could not but think that a number of other poisonous ingredients might be put in the same category as arsenic. He knew, however, it was the opinion of one of the most eminent medical men in London that a great deal of mischief might be done by publishing the fact that there were seventeen or eighteen other articles quite as deadly as arsenic. But recent offences had made some of these poisons so well known that he did not see why strychnine and one or two other poisons should not be put in the same category as arsenic. He was informed that his right hon. friend (Sir G. Grey) had promised to give the subject his best consideration during the recess.

The impracticability of placing poisons generally under regulations similar to those which are in force with regard to arsenic, must be obvious, and we also doubt the policy of including a long list of poisons in a *suggestive* Act of Parliament; but the proposal to place strychnia, and probably one or two other poisons under the same category as arsenic, is worthy of attention. If such an Act were passed, a schedule might be appended, stating the poisons to which the Act applies, and power might be given to the law-officers of the Crown, under the advice of the College of Physicians (or to any competent authority that might be thought best) to add to the list in the schedule any poison which at a future time may become "fashionable" for criminal purposes. By this provision, the law would not instruct the criminal poisoner in the means of carrying on his art, but it would follow close upon his heels with the means of tripping him up whenever he is found to be stealing a march on the profession.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES (*continued*).

Elected June and July.

MEMBERS.

GLOUCESTER	Wingate, Stephen
LONDON	Clarkson, James
LEOMINSTER	Davis, David F.

MAJOR EXAMINATIONS.

Calvert, John	Durham
Ford, Charles	Reading
Green, John	Oundle
Groves, Henry	Weymouth
Hayes, James	Tunbridge Wells
Houghton, William	Warrington
Reynolds, Arthur	Walton
Richards, Charles	Weymouth
Smeeton, George Henry	Leeds
Williams, David Martin	Truro
Yates, Francis	London

MINOR EXAMINATIONS.

Bell, William Middlewick	Stonehouse
Bolton, Horatio Nelson	Boston
Bond, Charles Rudcliffe	Ware
Britten, Thomas John	Leominster
Dulley, Joseph	Northampton
Paine, Standen	Brighton
Tiplady, Frederick	York

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH	TOWNS.
Brown, George	Mr. Forge	Great Driffield
Burton, John	Mr. Parker	Derby
Davison, William	Mr. Greaves	Bakewell
Eason, John	Mr. Gilkes	Leominster
Eminson, John	Mr. Marshall	Gainsborough
Fox, Edward M.	Mr. Michell	Falmouth
Green, James	Mr. Green	Bath
Halsey, Bennet	Mr. Husband	Exeter
Holt, William H.	Mr. Paulden	Ulrincham
Jackson, John	Messrs. Wilson and Co.	Bradford
Mohun, Martin	Messrs. Argles and Co.	Maidstone
Newby, John	Mr. Hughes	Altrincham
Overton, William	Mr. Fowke	Stafford
Smart, Benjamin	Messrs. Lea and Co.	Worcester
Walsh, Edward	Messrs. Argles and Co.	Maidstone
Waugh, Alexander	Messrs. Randall	Southampton

PHARMACEUTICAL SOCIETY,

NORTH BRITISH BRANCH.

LECTURE ON STRYCHNINE.

BY STEVENSON MACADAM, PH.D., F.R.S.E.;

Lecturer on Chemistry in the Medical School, Surgeons' Hall, Edinburgh; and to the Pharmaceutical Society of Great Britain.

The many different opinions which have been lately expressed by scientific men, as to the possibility of detecting the presence of strychnine in the animal system, having been productive of much uncertainty and apprehension in the public mind, I have thought it my duty, as a Chemist, minutely to investigate the subject. With this view I have recently undertaken an extensive series of experiments, and as these have led me to a positive conclusion regarding strychnine poisoning, I consider it right that such should be early communicated to those who are professionally interested in this to-day all-absorbing topic.

The principal source of strychnine is in the *Strychnos Nux Vomica*, the *poison nut* or *Koochla* tree, which grows abundantly in the southern districts of India, on the Malabar and Coromandel Coasts, as likewise in the Island of Ceylon. It is a middling-sized tree, with a crooked stem, and large leaves of a roundish form, and smooth and shining on the surface. The tree bears small greenish-white flowers, and yields a berry or fruit about the size of an orange, and of a similar colour, when ripe. The fruit is covered with a hard, smooth, and brittle shell, and is filled with a white, soft, gelatinous pulp, in which the seeds are imbedded, like pips in an apple, or seeds in an orange. The pulp of the fruit is harmless, in fact, perfectly innocent, and is greedily devoured by many kinds of birds, whilst the seeds enclosed in the pulp contain strychnine, and are thereby poisonous.

The seeds of the Strychnos Nux Vomica are round, about one inch in diameter, by a quarter of an inch in thickness, and present a shield-like form, being a little convex on one side and concave on the other. From their resemblance to eyes, and being poisonous to crows, the Germans call them "crow's eyes." The outer coat of the seed is of an ash grey or yellow colour, covered with short silky hairs, and envelops a horny substance of a dirty white colour, and very bitter taste. The seeds are composed of the three alkaloids, strychnine, brucine, and igasurine, in combination with igasuric acid, and accompanied by a greater or less proportion of gum, wax, starch, bassorine, woody fibre, concrete oil, yellow colouring matter, and earthy salts.

The bark of the Strychnos Nux Vomica is, when the plant is young, of an ash grey tint, which, as the tree becomes more advanced, assumes a rusty colour. It contains brucine united with gallic acid, and associated with woody fibre, gum, sugar, yellow colouring matter, and earthy salts. Strychnine is not, therefore, present in the bark, nevertheless the brucine confers poisonous properties upon it, and when administered to the lower animals, it speedily causes death. A large quantity of the bark found its way into Hamburgh in 1804, and from its resemblance to Angustura bark, it was mistaken for that substance, and used in medicine instead thereof. But on its poisonous powers becoming apparent, its employment was prohibited, and the name of *false Angustura bark* applied to it.

When the seeds are reduced to powder, they yield *powdered nux vomica*, of a fallow grey colour, and possessing an intensely bitter taste. When treated with concentrated sulphuric acid the powder is charred, and when acted on by concentrated nitric acid, it becomes orange-red.

In the preparation of strychnine, the nux vomica powder is digested in dilute sulphuric acid for twenty-four hours, boiled for half an hour, and the liquid decanted. This process is repeated till all the soluble matter is extracted. By this action of sulphuric acid, the strychnine and brucine are separated from their compounds with igasuric acid, and are converted into sulphates of strychnine and brucine. The liquid is filtered from insoluble matter, and evaporated down to the consistence of a syrup. Alcohol is then added, and heat applied. During ebullition, slaked lime is projected little by little into the alcoholic extract, which combines with the sulphuric acid to form sulphate of lime, and liberates the strychnine and brucine, which remain in solution in the hot alcohol. By distillation the alcohol is volatilized, and the strychnine and brucine deposited. Sulphuric acid is cautiously added to dissolve the alkaloids, which are again thrown down by caustic ammonia. The precipitate, which consists of strychnine and brucine, is dissolved in hot alcohol; some animal charcoal is added to the liquid, which is shortly thereafter filtered. The solution is then cooled down, when the alcohol allows the strychnine to crystallize out, whilst it retains in solution the brucine. An improvement in this process has been suggested by Molyn, who moistens the powder with water, and allows fermentation to proceed, before the after-stages of the process are gone on with.

Strychnine, when pure, is a white substance, and can be purchased either in powder or in crystals. It has no odour, but an intensely bitter taste,* one part of strychnine in one million of water being perceptible. It is sparingly soluble in water, one part of strychnine requiring 2,500 parts of hot water, and 6,667 parts of cold water to dissolve it. The latter proportion is equivalent to one grain of strychnine in a pint bottle of water. Ether, chloroform, and warm alcohol are ready solvents of strychnine, whilst cold alcohol takes up but a small amount. The acids, hydrochloric, sulphuric, oxalic, tartaric, and acetic, readily combine with strychnine, forming salts, all of which are readily soluble in water. When strychnine is heated, it fuses, and in the act of volatilizing is decomposed. When ignited along with bases, strychnine yields a volatile base called quinoline, $C_{18}H_8N$.

Strychnine belongs to a numerous class of substances named the alkaloids, all of which are alkaline to test colours, the greater number possess poisonous properties, and strychnine is one of the most deadly of its class. Even plants, when subjected to the influence of strychnine, quickly hang their heads, droop, and die.

The tests for strychnine are many, and some of these are quite characteristic. The following table contains

THE STRYCHNINE TESTS.

A. *Potass*, a white precipitate, insoluble in excess.

B. *Bicarbonate of Soda* (in acid solution), no precipitate.

C. *Sulphocyanide of Potassium*, a white precipitate.

D. *Perchloride of Mercury*, a white precipitate.

E. *Perchloride of Gold*, a lemon yellow precipitate.

F. *Chlorine Water*, a white precipitate, which dissolves in *ammonia* to colourless liquid.

G. *Nitric Acid* (cold), colourless solution; (heat), yellow solution.

H. *Sulphuric Acid* (with trace of *Nitric Acid*) and *Binoxide of Lead*, a violet → red colour.

I. *Sulphuric Acid* and *Binoxide of Manganese*, a violet → red colour.

J. *Sulphuric Acid* and *Bichromate of Potash*, a violet → red colour.

The tests A to G cannot be applied excepting where the quantity of strychnine at the command of the operator is considerable, so that in dilute solutions they fail to act. The remaining tests, H to J, are, however, much more delicate, and will indicate a most minute amount of strychnine. So far as my experience goes, I prefer the sulphuric acid and bichromate of potash test, as it is much more certain in its action, and is more delicate than any or all of the other tests. The colour indications are best seen in a pure solution of strychnine; the presence of organic matter impedes the action of the test, and alcohol, acetic acid, and other bodies, entirely destroy the characteristic colour. In order to steer clear of these sources of error, Dr. Letheby has lately suggested that the substance to be tested should be treated with sulphuric acid, and placed on a piece of platinum foil connected with the positive pole of a galvanic battery, and thereafter, on touching the liquid with the negative pole of the battery, which terminates in a platinum wire, the characteristic violet tint is at once produced. In this way $\frac{1}{10000}$th of strychnine in pure water has been detected. I have repeatedly tried this process, and can bear witness to the accuracy of the test; but in practice I have found the sulphuric acid and bichromate of potash to be a more delicate test, though it is much more difficult to manage. Lately a good deal has been said in disparagement of the colour tests for strychnine, and considerable doubt has been thrown upon the trustworthiness of colour tests in general. Precipitate tests are certainly more satisfactory than colour tests, because they signify the presence of a larger amount of the particular substance under examination; but, in general, colour tests are far more delicate in their action than precipitate tests. A very good example of this occurs in testing for iodides. When these are abundant, precipitate tests with soluble salts of lead and mercury may be readily obtained; but by dilution a point is at last reached when lead or mercury solutions cease to be precipitated by the liquid containing the iodide. At this point the starch test, which, in a very dilute solution of an iodide is essentially a colour test, comes into play, and long after the precipitate tests fail to indicate an iodide, the colour test shows unmistakable evidence of its presence. The same remark applies to testing for solutions of persalts of iron, and copper, by means of ferrocyanide of potassium. In strong solutions a blue precipitate is indicative of iron, and a ruddy-brown precipitate speaks of copper; but when dilute solutions are examined, blue and ruddy-brown colourizations are alone obtained. Colour tests, therefore, are the most delicate of all tests; they indicate the presence of a body when precipitate tests cannot do so; and for my own part, I see no reason why I should distrust my sense of colour whilst manipulating in my laboratory, and confide in it at other times.

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* The taste forms a very good confirmation test for strychnine.

I have now to refer to the action of strychnine on animals, with special reference to its subsequent detection in the animal system. At the beginning of June, through the kindness of the Messrs. Hislop, of Prestonpans, a two-year old horse was placed at my disposal. The animal was in good condition, and, saving that he was broken-winded, was in every other respect perfectly sound. The strychnine was at first administered in small doses at a time, the object being not to kill the animal till there was the likelihood of some of the poison being absorbed into the system.

The following table gives the doses of strychnine given to, and the symptoms exhibited by

THE HORSE.

0 minute.	3 grs. of strychnine in meal and water.
25 minutes.	3 grs. ditto ditto.
45 "	6 grs. ditto in ball, made up of barley meal.
1 hour.	First tremor observed. Twitchings of the facial muscles.
1 " 2 "	Tremors.
1 " 20 "	6 grs. of strychnine in ball, made up of grease and meal. Twitchings and tremors.
1 " 45 "	6 grs. of strychnine in mash, made up of bran, oats, and beans, bruised and mixed.
1 " 50 "	12 grs. of strychnine in mash.
2 hours.	Quick and alternate motion of the limbs—convulsive cries—tetanus set in—horse fell on its side.
2 " 1 minute.	Death.

The sudden death of the horse after the tetanic symptoms began to manifest themselves, may be attributed to its old complaint, broken-windedness. The physiological effects of strychnine were therefore not well seen in this instance, but the case was interesting otherwise, as will presently appear.

On the evening of the same day I brought to town the stomach and its contents; the bladder and its contents; one-half of the spleen, liver, lungs, heart, and kidneys; with a large quantity of blood and muscle. The remainder of the horse was buried where it could be readily exhumed.

In examining animal matter for strychnine I have found the following process eminently serviceable, and I confidently commend it to the notice of analysts, as a method which can be depended upon. The animal matter when solid is chopped into minute fragments, and treated with a dilute solution of oxalic acid. After standing for twenty-four hours, during which time the mass is repeatedly agitated, the whole is filtered through muslin. The contents of the filter are well washed with water, and the washings added to the filtrate. The liquid so obtained is heated to ebullition, when albuminous matters separate, and whilst warm is filtered through paper. Animal charcoal is added to the filtrate, and after repeated agitation during twenty-four hours, the supernatant liquid is decanted off, and the charcoal received on a paper filter, where it is well washed with cold water. The charcoal, now retaining the strychnine, is allowed to dry spontaneously, thereafter placed in a flask, drenched with alcohol, and the whole kept for two hours at a temperature barely short of ebullition. The alcoholic extract is separated by filtration from the charcoal, and is evaporated down to dryness in a porcelain vessel, at a water-bath heat. The residue so obtained will generally be found in a fit condition to be at once tested for strychnine; but should such not be the case, a few drops of oxalic acid solution are again added, and the process repeated from the action of charcoal downwards. Proceeding in this manner, with several parts of the horse, I found distinct evidence of the presence of strychnine in (1) the contents of the stomach, (2) the muscle, (3) the blood, and (4) the urine. The latter had been collected in the bladder under very favourable circumstances, as the horse passed its urine immediately prior to the administration of the strychnine doses, so that the contents of the bladder experimented on by me, had all been secreted during the period the animal was under treatment by strychnine. Whilst successful in tracing the presence of strychnine in the contents of the stomach, the muscle, the blood, and the urine of the horse, I have to record its non-detection in the liver, spleen, lungs, kidneys, and heart. Its apparent absence in these organs may be attributed to the process which was followed in manipulating with them. Instead of employing oxalic acid in the first step of the process, I substituted in its place dilute hydrochloric acid. This may appear a very slight alteration in the method pursued, but nevertheless I believe it to be sufficient to account for the non-appearance of the strychnine. Indeed, experiments made on portions of the contents of the stomach, muscle, and blood, demonstrated, that whilst these, when treated with oxalic acid, yielded decided indications of strychnine, yet other portions to which hydrochloric acid had been added, only gave the faintest signs of its presence. That strychnine was diffused through the portions of liver, spleen, lungs, kidneys, and heart experimented upon appears certain, as four weeks afterwards, by following the oxalic acid process, I detected its presence in those parts which had been buried. Hydrochloric acid is, therefore, unserviceable in testing for strychnine in the animal system. Tartaric acid gives results equally successful with those yielded by oxalic acid, whilst acetic acid has always appeared to me troublesome on the application of the colour test. In after experiments on strychnine poisoning, the oxalic acid process was rigidly adhered to.

Through the kindness of Dr. Littlejohn, Lecturer on Medical Jurisprudence, I became part on-looker and part experimenter on a large dog, which had been seized and incarcerated by the Edinburgh police The following are the doses, &c., given to

THE LARGE POLICE DOG.

0 minute.	$\frac{1}{12}$ gr. of strychnine in bread-pill.
15 minutes.	$\frac{1}{12}$ gr. ditto ditto.
35 "	$\frac{1}{12}$ gr. ditto ditto.
45 "	$\frac{1}{12}$ gr. ditto ditto.
1 hour 15 "	3 grs. of strychnine on liver.
1 " 30 "	3 grs. ditto ditto.
1 " 40 "	Symptoms of uneasiness.
1 " 45 "	Quick running motion—animal fell on its side—most violent tetanic spasms came on, accompanied by heavy breathings.
1 " 55 "	Repose.
1 " 58 "	Death.

The *post mortem* examination was conducted under the superintendence of Dr. Littlejohn, and the parts were handed over to me. Strychnine was present in (1) the intestines, (2) the blood, (3) urine, and (4) muscle. In this instance the strychnine tests were very distinctly noticed, and it must be particularly observed, the stomach and its contents, as also the lungs, liver, spleen, heart, and kidneys, were not delivered to me.

These experiments on the HORSE and LARGE POLICE DOG satisfied me that an animal poisoned by strychnine in ordinary circumstances, will exhibit distinct evidence of the presence of the poison in the contents of the stomach, contents of the intestines, the blood, urine, and muscle.

Now it has been lately suggested that antimony in the condition of tartar emetic is capable of destroying, retaining, or concealing strychnine, in such a manner, that even where it has been administered as a poison, yet still, if preceded or accompanied by tartar emetic, the organic poison escapes detection. On this point I have made some experiments. Two healthy dogs were treated with tartar emetic for four days, receiving each a quarter grain dose four times a day. On the fifth day, strychnine was simultaneously administered to both dogs. For convenience of reference I will designate these animals by their prevailing colour ; the white dog and the black dog :—

THE WHITE DOG.

0	minute.	½ gr. strychnine on liver.
9	minutes.	The dog passed its urine, which was collected.
17	"	½ gr. strychnine on liver. The dog in attempting to seize this piece of liver, let it drop ; it then licked off some of the strychnine and repeatedly attempted to snap up the liver, but could not do so.
18	"	Tremors ; quick running motion ; tetanic spasms and heavy breathings.
31	"	Repose.
40	"	Death.

On being tested, strychnine was very distinctly observed in (1) the contents of the stomach, (2) the contents of the intestines, (3) the blood, (4) the urine, and (5) the lungs, liver, spleen, heart, and kidneys and muscle combined. The presence of strychnine in the urine voided only nine minutes after the first administration of the alkaloid, is worthy of special notice. This experiment demonstrated, that a preliminary treatment with antimony does not militate against the discovery of strychnine in animal matters.

The BLACK DOG, which had likewise been under antimonial treatment for four days, received its doses of strychnine, accompanied by extract of hemlock. The latter was given for the purpose of observing how far coniine might retard or relieve the spasms.

THE BLACK DOG.

0	minute.	½ gr. strychnine, and 4 grs. extract of hemlock on liver.	
17	minutes.	Ditto,	ditto
30	"	Ditto,	ditto
33	"	Tremors; tetanic spasms and heavy breathings. Repose (time not noted).	
1 hour 2	"	Death.	

On examining the various parts of this animal, strychnine was distinctly observed in (1) the contents of the stomach, (2) contents of the intestines, (3) the blood, (4) the urine, and (5) lungs, liver, heart, spleen, and kidneys, and muscle together. The experiment afforded a second proof that antimony does not render the detection of strychnine in the animal system more difficult. Indeed, from the more distinct indications of strychnine obtained from every part of the WHITE DOG and BLACK DOG, as contrasted with the HORSE and LARGE POLICE DOG, I am inclined to regard the previous administration of antimony as favourable to the chemical detection of strychnine after death. Although it would be injudicious to deduce a positive conclusion from a single experiment, yet I may be allowed to draw attention to the influence which the coniine appeared to exercise over the action of strychnine. The WHITE DOG received less than a grain of strychnine, and was seized with tetanus in eighteen minutes from the commencement of the experiment, and died in twenty minutes after the tetanic symptoms manifested themselves; whilst the BLACK DOG, which had partaken of fully a grain and a half of strychnine, along with extract of hemlock, was not seized with tetanus till thirty-three minutes after the administration of the first dose, and survived the appearance of the spasms for twenty-nine minutes. In other words, the WHITE DOG had passed through the severest stages, and had fallen into the period of repose, before the BLACK DOG, with more strychnine to act upon its system, showed the slightest uneasy feeling. Moreover, after the spasms did come on, they were at no time so severe in the case of the BLACK DOG as those occurring in the WHITE DOG.

An experiment was likewise performed for the purpose of determining how far morphia influenced strychnine poisoning. For this purpose a healthy cat was treated as follows :—

THE CAT.

0	minute.	¼ gr. strychnine and 1 gr. muriate of morphia.	
38	minutes.	Ditto	ditto

On both occasions the powder was placed by force in the mouth of the cat, as the animal could not be induced to take it in food. Much frothy matter was expelled from the mouth, and some strychnine was doubtless lost in this way.

43 minutes.	Tremors—tetanic spasms—claws repeatedly expanded and retracted.
46 "	Laborious breathing—pupils much dilated.
50 "	Head thrown back, causing the body to describe an arch—animal then thrown on its side—heavy breathing, accompanied by more or less violent spasms.
53 "	Repose.
56 "	Death.

In this instance I cannot say the spasms were in the slightest degree relieved by the morphia. Their occurrence appeared to be delayed for a short time, but when tetanus did come on, the spasms were no less violent than when strychnine was administered alone.

Chemical analysis showed strychnine to be present in (1) the contents of the stomach, (2) contents of the duodenum, (3) muscle, (4) liver, spleen, lungs, heart, and kidneys, (5) blood, and (6) urine.

Granting then that strychnine can be discovered throughout the system of an animal poisoned by it, the question comes to be, will not time, with its host of putrefying agents, rub out all trace of the poison? On this point I have some experiments to adduce. The HORSE, previously referred to, after being buried for four weeks, was again exhumed, and the remaining portions of the lungs, liver, and heart, with a considerable portion of muscle and intestine, were taken out and submitted to analysis. Strychnine was present in (1) the intestines, (2) muscle, and (3) the lungs, liver, and heart. Other portions of the HORSE, which had lain above ground for three weeks, and which were in an advanced stage of decomposition, were likewise tested. These parts were (1) the contents of the stomach, (2) the muscle, and (3) the blood, and strychnine was detected in all. Even the stomach itself, which had been exposed above ground for three weeks and a half, on being washed free from a portion of the contents which were still adhering to its inner coat, chopped up, and analysed, yielded distinct evidence of strychnine. Again, as further proof of the possibility of detecting strychnine sometime after death, I have to bring forward some observations made upon a DUCK, which was poisoned by strychnine on the same day as the HORSE. The following are the doses given, and the symptoms exhibited by

THE DUCK.

0 minute.	3 grs. strychnine in mash.
15 minutes.	Fluttering of wings—Spasms more or less violent, intermitted with periods of repose—at times the bird was so rigid that it could be lifted up by the foot and held straight out.
2 hours.	½ gr. strychnine placed on tongue—Successive and intermittent periods of tetanus and repose.
3 " 30 "	Death.

The dose of strychnine given to the DUCK was undoubtedly out of proportion, but it was administered for the purpose of more speedily killing it. The bird was partly dissected two days after its death, and was laid aside for three weeks and a half. By that time it was much decomposed, and maggots were crawling abundantly over and through it. The maggots, it must be particularly observed, were *living* maggots, not *dead* ones! On examination, strychnine was detected in (1) the gizzard and contents, (2) the intestines and contents, and (3) the muscle, with the lungs, liver, heart, &c.

These later experiments demonstrate that strychnine can be discovered in the animal system after a reasonable time has been allowed to pass. It is quite possible, and I believe it probable, that, by-and-by, when the animal matter in which the strychnine is lodged is itself decomposed, that the strychnine atoms will likewise resolve themselves into more simple compounds, and the time come when strychnine can be no longer recognized or even traced. It has lately been advanced, that strychnine is so stable and indestructible a substance, that it ought to be recognized in the *débris* arising from the decomposition of the animal killed by it; but such appears to me highly improbable. It is doubtless true, that concentrated sulphuric acid may be heated over strych nine without decomposing the alkaloids, and the tests for strychnine may be as readily observed after the heating with sulphuric acid as before. Considering the readiness with which sulphuric acid decomposes most organic bodies, this non-action on strychnine must be considered a very severe test, and one which says much in favour of the stability of strychnine. But it is not a conclusive experiment as regards the influence which the natural putrefactive powers may, and can exert on one organic substance in presence of a second organic body, which is itself undergoing active decomposition. There are changes proceeding every day in the putrefaction and decay of vegetable and animal matter which the chemist cannot explain, and which, as yet, he has failed to follow in his laboratory, with the aid of his glass jars, acids, and alkalies. This remark applies with still greater force to the action of a living plant or animal on material brought within their reach. We cannot prejudge the processes of organic life from experiments upon dead and inorganic substances. There are combinations and decompositions going on during the life of plants and animals, which we cannot repeat or copy. Why the tiniest plant, the most minute lichen, moss, seaweed, or fungus; the pigmy insect whose life and generation is compassed by a single day, as well as the microscopic animalcule, compound matter, and change its state and form, in a manner which defies our steam-engines and steam-hammers to accomplish; and which all the resources of heat and light and electricity, directed and backed by the ingenuity and intellect of man, have failed even to approach.

The main difference between the possibility of detecting organic poisons, in contradistinction to inorganic, lies in the more ready and irretrievable changes which happen to organic matter in its passage through, or retention in, the animal system. A poison, such as phosphorus, may be oxidized into phosphoric acid, or arsenious acid may become sulpharsenious acid, and yet they are easily recognizable. We can test the new compound, the product of the change, or, if the operator choose, he can extract therefrom the original substance, and examine the poison itself. But it is not so with the majority of the organic poisons when they suffer a change; and in this respect, strychnine does not stand alone. The animal is an oxidizing agent of the most powerful kind; and if it can so far succeed as to link a few atoms of oxygen to the complex molecule of strychnine, no known process can be resorted to for the purpose of sifting and reuniting the strychnine components into a strychnine atom. The possibility of the oxidation and consequent destruction of a sensible amount of strychnine by the animal, is still an open question; and all that is at present advanced is, that the animal *may* possess that power in a slight degree.

Granting, then, that strychnine, like other organic compounds, may be liable to change in the animal organism, the important question arises, will strychnine, which has been administered in minimum doses, in quantity just sufficient to cause harm to an animal, and by-and-by, in days or weeks, to kill it, will that amount of strychnine be retained in the system of the animal, in such form as to render its detection possible? On this point I have an experiment to adduce. A large-sized TERRIER DOG was fed for two weeks on the flesh of the HORSE previously referred to, and every day during this period he partook of two pounds of muscle. The TERRIER DOG lived and thrived on the flesh, and did not betray the faintest shadow of tetanic symptoms. In this respect he agreed with the maggots which throve so well on the putrefying DUCK. Of course, there may be something in being born in a strychnine district, such as the maggots were, but this cannot be said in favour of the TERRIER DOG living on the flesh of the HORSE. Incidentally I may notice, that these two experiments lead me to regard it improbable that one animal should be killed by eating the *flesh* of another which had been destroyed by strychnine in the ordinary way. At the same time, I should expect the carnivorous animal to die, provided he partook of such parts as the stomach, the duodenum, or even the blood. These remarks apply only to the remains of animals which have been killed by the introduction of strychnine into the stomach, and do not refer to animals which, after death, have had strychnine placed in incisions made in their muscular system. Now, the TERRIER DOG had for two weeks been receiving strychnine in the minimum of minimum doses, and if the animal system can *sensibly* decompose strychnine, it ought in this instance to have occurred. At first, I thought of killing this animal by violence or by prussic acid, and thereafter examining the various organs for strychnine, but disappointed at the non-appearance of the physiological effects, and believing it unlikely that strychnine could be present in appreciable amount without causing spasms, I unfortunately proceeded to make him the subject of an experiment as to the power of coniine to retard or destroy the action of strychnine.

The following are the doses of strychnine and coniine administered to, and the effects produced on.

THE TERRIER DOG.

0 minute.	1 grain strychnine, and 2 drops coniine, on liver.
25 minutes.	½ grain strychnine, and 1 drop coniine, on liver.
41 "	Quick motion of limbs.
	Spasms.
42 "	Heavy breathings and spasms.
48 "	Repose.
	A gentle touch or rub occasioned no spasms.
54 "	A smart touch gave rise to most violent spasms and heavy breathings.
56 "	Repose—slowly passed urine.
59 "	Heart stopped beating, and again commenced.
1 hour 3 "	Heart's action ceased.

In this instance I examined (1) the stomach and its contents, (2) the duodenum and its contents, (3) the smaller intestines, (4) the muscle, (5) the lungs, liver, heart, spleen, and kidneys, (6) the blood, (7) the bladder, with a mere trace of urine; and in each separately, I detected strychnine in considerable amount. Now, it must be distinctly observed, that the quantity of strychnine extracted from the tissues and organs of the TERRIER DOG was many times greater than that obtained by me in any other instance. Moreover, the strychnine was likewise observed in the smaller intestines, where I could not find strychnine in the only other instance (THE CAT) in which I tested these separately from the duodenum. In all the cases of direct poisoning by strychnine which I have examined, a certain small amount of strychnine was discovered in the animal, and, judging from the amount of the colour test obtained, I should draw the conclusion that the quantity of strychnine lodged in the tissues of the animal was the same in all. But in the instance of the TERRIER DOG, which had undergone the preliminary treatment of eating about 28lbs. of horse-flesh containing strychnine, and was thereafter poisoned by a dose of strychnine not larger than that given to the others, I find a very much larger and extra amount of the alkaloid. This excess of strychnine in the tissue of the TERRIER DOG over the normal amount present in the tissue of an animal quickly killed by strychnine, must, I presume, have been obtained and retained from the horse-flesh on which the DOG had been previously fed. This point, coupled with the presence of strychnine in the smaller intestines, leads me to believe that had I examined the TERRIER DOG after he had fed on the HORSE, and without using strychnine as the killing dose, I would have found indications of that alkaloid in every part of the system. This experiment is to me conclusive as to the accumulation of strychnine in the animal system, and suggests the important deduction that minimum doses, whilst they may not kill quickly, are the most certain way in which strychnine can be administered, so that it may be afterwards discovered by the Chemist.

I am far from considering that the foregoing experiments exhaust the subject of poisoning by strychnine. I commenced the investigation with the earnest desire to make myself conversant with a method by which I could afterwards depend upon, were I called upon to search for strychnine in animal matter. I have all along said as little as possible regarding the physiological effects of the poison, and the condition of the animal system after death, as these are points which I cannot pretend to discuss. I think it right, however, to state, that (1) the animal was always flaccid immediately after death; (2) after tetanus set in, there were periods of repose, during which the animal could be touched gently, and no spasms were occasioned thereby; (3) the condition of the heart at death was various—at times the right side was empty, and at other times both sides of the heart were gorged with blood; and (4) different periods of time marked the commencement and duration of the symptoms.

In summing up these remarks on strychnine poisoning, I deduce from the results of the experiments, the following conclusions:—

(1.) That when administered to the animal, strychnine is absorbed and retained in its system.

(2.) That strychnine is not sensibly destroyed in the animal system during life, nor by the partial decomposition of the animal tissue consequent on death.

(3.) That minimum doses of strychnine may cause the animal to exhibit, but partially or not at all, the physiological effects, but such doses are the most favourable for the Chemist; so that as the physiological evidence decreases, or sinks to a minimum, the chemical proof increases or rises to a maximum.

(4.) That tartar emetic, muriate of morphine, extract of hemlock, and coniine may retard or relieve the spasms, but they do not in the slightest degree hinder the chemical isolation and detection of strychnine.

(5.) That by proper treatment, strychnine can be separated from organized tissue and organic matter in general, as easily as any other poison—arsenic not excepted—and much more easily than most other poisonous substances.

(6.) That, when isolated, strychnine can be distinguished by a special test, which is unerring and most delicate, and which will detect the merest trace.

(7.) That the decomposition or natural decay of the animal frame *may* cause the destruction of the strychnine, but in this, TIME will no more easily blot out all traces of strychnine, than it will obliterate the mark of the knife of the assassin.

In conclusion, I have two suggestions to make. The first is to our law authorities, and I would ask them in future not to hand the Chemist merely fractional pieces of a subject supposed to be poisoned, but to give him over the entire body for chemical analysis; and, for my own part, when called upon in future to undertake a medico-legal investigation, I will insist on my having the whole subject to work upon, and, if such is not granted me, I will protest against my analysis being regarded as conclusive.

The second suggestion I have to make is to the poisoner. Were I to turn knave Chemist, and the poisoner were to ask me what substance he could most certainly employ, whereby he would most surely get rid of his victim and at the same time escape the hands of justice, I would say to him, "Take this poison, or that, or the other; but, as you value your life, my good fellow, don't you try strychnine."

ORIGINAL AND EXTRACTED ARTICLES.

ALOINE.

BY MR. T. B. GROVES.

In the July, 1851, number of the *Pharmaceutical Journal*, appeared a paper by Messrs. Smith, of Edinburgh, on Aloine, a crystalline principle they had succeeded in isolating from Barbadoes aloes, and which they regarded as its active principle. They proved also the existence of this body in a crystalline state in the Cape and Socotrine varieties, though they succeeded in obtaining from them only very insignificant quantities.

The behaviour of aloine with reagents was fully detailed by them, and its formula supplied, as obtained by Dr. Stenhouse.

This latter Chemist also devoted considerable attention to the subject, and arrived at the same results as Messrs. Smith—that aloine is scarcely obtainable in sufficient quantity, or in such a state of purity as to be recognizable, from any other than the Barbadoes variety.

M. Robiquet, in an article read to the Académie de Médecine, Feb. 26, 1856, and published in the *Chemist* of July, 1856, arrived at the same conclusion with regard to Cape and Socotrine aloes, but gives a much more easy and productive process for its preparation from Barbadoes aloes.

All these gentlemen express their belief that the opaque varieties alone contain any considerable proportion of aloine in a crystallizable state, and that the vitreous or translucent varieties have undergone the action of heat subsequent to inspissation, and that the fusion has converted the aloine into an amorphous substance, quasi-resinous. From a perusal of the works of the two first experimenters, and a consideration of what had hitherto been published respecting the manufacture of the different varieties of aloes, I was early led to doubt the accuracy of some of their conclusions.

For instance, Pereira states that the best Barbadoes aloes is procured by evaporating in a copper vessel over a naked fire the juice that spontaneously exudes from the transversely cut stems of the aloe (the decoction of the leaves is not unfrequently used), and that the evaporation is carried to such a point that the extract on cooling "breaks short"—in other words, has been reduced to dryness and incipient fusion.

The Socotrine, on the contrary, appears to be the pure spontaneously exuded juice of the cut leaves, evaporated, after depositing its grosser parts, by the sole agency of the sun.

If it be true then that aloine is so readily altered by contact of air, simultaneously with the application of heat, one would scarcely be justified in attempting its preparation from the former kind, without first applying to the latter.

Again, aloine is proved to be but slightly soluble in cold water, then why use cold for its separation? or, ether, which dissolves it so sparingly?

I shall be able to show that Socotrine aloes contains a considerable proportion of crystallizable aloine, to be obtained from it without extraordinary difficulty or precaution.

The following circumstance that occurred shortly after the publication of Messrs. Smith's paper, first suggested an inquiry. I was engaged in filling a small pot with the aqueous extract of Socotrine aloes, when I was called away for a short time, and on returning, observed that a bubble of considerable size had, by the gradual subsidence of the extract, formed on its surface. The extract, when first made, had been perfectly transparent, but the surface of the bubble I observed to be studded with bodies of a regular shape, which unassisted sight enabled me to recognize as crystals of aloine—the microscope afforded more certain evidence.

I will here observe parenthetically, that by cautiously blowing a bubble of a suspected extract, a very trifling amount of crystallization may be detected, that cannot readily be discovered in any other way.

The extract that afforded this indication had been prepared by exhausting Socotrine aloes with boiling water; filtering the cooled liquor, a little carbonate of magnesia being previously added; and evaporating by a steam heat. The exhaustion requires a little knack. The aloes should be coarsely powdered, and sifted through a 40-hole brass sieve, then shaken lightly off a wide spatula into the boiling water, kept in constant agitation during the addition, and maintained in that state for twenty minutes after. The aloes will by this means be completely exhausted, and, by allowing the liquor to stand quiet till cold, the resinoid substances will deposit and adhere to the bottom and sides. The magnesia is added without decanting the liquor from the vessel. It filters very readily through serge, affording a perfectly bright liquid and extract. It is rendered turbid by the addition of acid.

Aloine has not been permanently introduced into medical practice in this part of the world, so that I had no inducement to prepare a larger quantity than sufficed for experiment. Indeed, in investigations in general, the smaller in reason the quantity of material operated on, the greater will be the care expended on it, and less dubious the results arrived at—the chief disadvantage being the loss occasioned by not being able to economize the mother-liquors.

One ounce of Socotrine aloes was therefore powdered and exhausted as previously described. When cold, hydrochloric acid was added to slight acidulation—a resinous precipitate was formed, which caused filtration to proceed with great difficulty. The addition of finely-powdered wood charcoal would have much facilitated it. Washed arrowroot has not so good an effect. The solution was, after filtration, evaporated by a water-bath to the consistence of syrup, transferred to a small basin covered by bibulous paper, and set aside on a shelf of the laboratory.

In less than a week crystallization had commenced; in a fortnight it had become a mass of crystals, that had grown irregularly, considerably above the level of the liquid. They were transferred to coarse blotting-paper, allowed to drain a day or two, then shifted to another piece, wrapped in it, and gently pressed by means of a weight. Cautiously proceeding thus, they were at last powerfully pressed with a screw, and presented the appearance of a brown-coloured brittle mass. This was dissolved in as small a quantity as possible of boiling water, allowed a few days to crystallize, and then treated as before. A third crystallization sufficed to procure crystals of a pale lemon colour (pure aloine), which weighed when dry 48 grains—10 per cent. of the aloes employed. I found it was necessary to dry them in the compressed mass, closely wrapped in blotting-paper, and at a temperature of about 100. The surface and edges only were oxidized, and were removed before powdering and weighing. When thoroughly dry, it does not appear to undergo change at the ordinary temperature. When damp, however, and at the same time exposed to heat, it oxidized rapidly, and could be made to assume almost exactly the appearance of the aloes whence it was originally taken.

I am therefore of opinion that it is not to their possessing a vitreous character, but to circumstances connected with the composition of the original juice from which they are made, that the various degrees of facility with which aloine may be obtained from them is due, and that aloine may be procured from all that have not been actually carbonized.

With respect to its purgative power, of which M. Robiquet denies it the possession, and which, to cause such variety of opinion, must at least be very uncertain, I think with M. R. that it is only when oxidized it possesses that power. It would be impossible for it to pass through the intestines without some degree of oxidation, and that degree would vary as circumstances varied during its passage: the variation of its purgative activity is hereby accounted for. M. R. proposes to use it for the treatment of fever, &c., as an antiperiodic, and with the idea, I presume, of preventing its oxidation, and consequent aperient effect, gives it in combination with finely divided metallic iron (fer réduit).

Perhaps were the dose enveloped in wax or spermaceti, or still better, in Evans's membrane capsules, so that it may pass into the bowels previous to solution, the result would be more uniform.

Weymouth, July 21, 1856.

ON THE MUTUAL ACTION OF CHROMIC ACID AND THE VOLATILE OILS.

BY JOHN T. PLUMMER, M.D.

In the year 1848, while repeating some toxological experiments for the detection of strychnia, I observed a phenomenon, of which I made a record at the time, but did not institute much inquiry into the cause of it.

I had mixed together in a glass capsule (not, as usual, sulphuric and strychnia, but) sulphuric acid and chromate of potassa; and, while slowly approximating a drop of a very weak solution of strychnia in alcohol, on the end of a glass rod, I thought I perceived a change in the colour of the acid mixture nearest the drop before the two came in contact. This discovery induced me to continue the drop suspended over the mixture some time longer, until I became convinced, from the extension of the discoloration, that I was not mistaken in my observation.

As the colour produced was not red but *green*, I supposed it was not strychnia but alcohol, or one of its constituents, which passed over from the drop to the acid mixture. In order to determine this point, I placed two shallow concave glasses side by side, but *half an inch* distant from each other; and into one I put some newly-prepared mixture of the acid and chromate, and into the other alcohol. The alcohol maintained a quiet, well-defined margin, but the edge of the acid liquid immediately began to flap, and, commencing at the point nearest the alcohol, the whole mass of acid mixture gradually became green. The flapping of the margin of the acid is best seen under a magnifier.

My next object was to ascertain whether other volatile liquids would act in like manner as alcohol. Oil of peppermint was first substituted for the spirits. A violent effervescence began directly in the whole circumference of the oil (but, on subsequent examination, I found the same thing took place independent of the acid mixture), and the same discoloration followed as with the alcohol, until, as before, the whole body of the acid mixture became green. The surface of the acid liquid was one inch in diameter. While the change of colour was going on in this case, motes could be seen, under the microscope, rapidly approaching the edge nearest the oil; and in an instant wheel about and retreat, as if shot back by electrical repulsion. This motion was perceived even at the most remote part of the acid mixture, as the discoloration proceeded backward from the oil. The oil became thicker and opaque while under the influence of the acid, but when the glass was removed from the vicinity of the acids, the oil recovered its transparency but not its proper fluidity ; and, finally, a watery liquid separated from it, tasting like water impregnated with the oil.

The oils of lavender and sassafras behaved like alcohol as to the quietude of their margins ; and, unlike the oil of peppermint, caused no flapping motion in the acid mixture, but they all produced discoloration.

From the results of a limited number of experiments, I was at first tempted to think that my acid mixture had distinguished the terebenes of Löwig from the oxygenous volatile oils, long before this author had classified the fifth group of his hydro-polycarbyls into the terebene and non-terebene oils, but an extension of the experiments to the oils of lemon, orange, and cubebs, and to a number of oxygenous oils, did not tend to corroborate the impression.

The oil of lemon was very active, and so powerful as to cause the repulsion of comparatively large masses of undecomposed chromate of potassa in the acid mixture, at the distance of one inch or more.

The oil of orange (the genuineness of which, however, I had some reason to question) was also very energetic ; and, in addition, I observed under a moderate magnifier, a phenomenon unnoticed in the cases of the other oils. It consisted in an inimitable crumpling of the acid liquid next the oil, in parallel lines at right angles with the margin of the oil ; the whole outline presenting a double convexity, like the edge view of a double convex lens. The beautiful crumplings came and went like the corruscations of the boreal aurora.

The repulsive power of the oil of cubebs was far less apparent than that of the oils just named, but the decomposing agency was very striking, though slow in its action.

Oil of turpentine produced a moderate motion in the acid mixture, and finally darkened the colour of it till it became almost black ; but on diluting it, the colour became green.

The oils of origanum, of chenopodium and of gaultheria (oxygenous oils), occasioned more or less motion and discoloration in the acid mixture.

When the concave glasses containing the respective liquids were placed within a small fraction of an inch apart, with but a few drops of the liquid in them, and the chromate was in small blocks lying in the acid, a retreating action commenced in the acid mixture at the edge next the oil, by which the whole mass was driven along like water before wind ; and what made it still more curious was, that this action was not continuous, but intermittent ; an interval of several seconds transpiring between the motions. While witnessing the rolling over of the blocks of chromate, all in one direction and simultaneously, with suitable respites, I could hardly forbear fancying the existence of a little army of invisible Lilliputians adjusting their shoulders to the tiny rocks, and heaving them onward with simultaneous efforts, at the proper signal.

Whatever the agency was, it is certain that the whole mass, blocks of chromate and all, was driven to a remote part of the glass ; perhaps beyond the reach of further electrical action.

These experiments look very much like proving that chemical attraction is sometimes exerted at *sensible* distances, and *very* sensible distances. But one of the fluids being volatile, its particles may be brought within the attractive action of the sulphuric acid by the well-known affinity of that acid for atmospheric vapour causing currents; and in the case of alcohol, the direct affinity of the acid for that substance accounts for its greater activity. This view is corroborated, as glycerine, a non-volatile oxygenous compound, produced no action on the acid mixture; but when a small drop of alcohol was stirred up intimately with the glycerine, the change in the acid mixture soon detected its presence. (Does not this suggest that the acid mixture of chromate of potassa and sulphuric acid may serve in many cases to bring to light alcoholic adulterations of liquids, as well as sometimes a mixture of different oils?)

On trial with chromic acid in water, I was not successful in obtaining like results with the oils; that is, they effected no change in the acid. Does the sulphuric acid in the mixture, in consequence of its affinity for water, deprive the chromic acid of a part of its oxygen, and the oils of an equivalent of hydrogen, so as to form that fluid? Be this as it may, the sulphuric acid plays an important part in the phenomena described.—*American Journal of Pharmacy.*

ON RHATANY ROOT.

BY DR. SCHUCHARDT.

(*Continued from page* 32.)

When one can examine large quantities of Payta and Savanilla Rhatany, it is certainly no difficult task to distinguish the one from the other; but it is somewhat less easy to discover single pieces of the latter when mixed with Peruvian Rhatany. I think it therefore not superfluous to give a description of the new Rhatany, especially since the most copious works on Materia Medica, as Thomson, and even Pereira, in his new edition, are wholly silent on the subject. The short notices which occur in German works on Materia Medica and Pharmacy, describing roots found mixed, either accidentally or intentionally, with genuine Rhatany, are very brief and insufficient. Moreover, they say nothing about the internal structure of these roots, and nothing, of course, about the drug now under discussion. The only anatomical examination of Payta Rhatany hitherto made, is that of Berg, the result of which is published in brief in his work on Materia Medica.

As regards external appearance, the stems of the Savanilla Rhatany are never so knotty and irregularly rounded as those of the old kind of Rhatany, but are more symmetrical and slender, more regularly cylindrical, and generally shorter. Its roots (we cannot speak of one principal root), as to thickness, are as different as those of the stumpy variety of Payta Rhatany, but never so long as those of Peruvian Rhatany sometimes are. Their anatomical structure readily admits of their being broken, without the bark thereby splitting off. Pieces of root, from four to at most ten inches long, are the most frequent, and these with the root-stocks before described, to some of which are attached roots of from four to six inches, form the contents of the seron. The roots are marked with shallow, undulated furrows, which are near each other, but not always parallel. The roots are also marked, often all round, by deep narrow, transverse cracks, which sometimes even lay bare the wood. The bark is united to the wood by a rather broad inner cortical layer, and adheres to it with firmness. I shall revert to this rather important distinctive point when I describe the anatomical structure of the root.

It is difficult, in fact almost impossible, briefly to define the colour of Savanilla Rhatany. It is a singular mixture of different shades, a mixture of cinnamon-brown and violet-red, dusted, as it were, with a fine leaden grey. If slightly rubbed with a soft substance, the bark assumes a peculiar, almost garnet-red lustre, which widely differs from the weaker and duller resinous appearance of Peruvian Rhatany. The adhesion of the bark to the wood is so strong in Savanilla Rhatany Root, that when broken in pieces, the bark always remains attached, which is never the case in Payta Rhatany, where, if so treated, the bark splits or peels off. The colour of the wood is yellowish-white, almost alike in both roots; its fracture in both the old and new sort of Rhatany, and in old as well as young roots, is of the same character, namely, short-splintery [*kurzsplitterig*]. The fracture of the bark, on the other hand, is very different in the two sorts, as might be expected from the dissimilar texture of the layers. The bark of Payta Rhatany has a fibrous fracture, arising from the nature of its inner layer; the middle and outer layers break more evenly. The bark of Savanilla Rhatany has a nearly even fracture, its outer and middle layers presenting a somewhat powdery appearance.

The bark of Payta Rhatany, from its toughness, cannot be reduced to powder without considerable labour, but the bark of Savanilla Rhatany can be powdered without any particular difficulty. The powder of the latter is of a purplish red, resembling very much that of tormentilla root; while the powder of the root of Peruvian Rhatany is easily distinguished by its tint of brownish-red and cinnamon.

If the characters and properties of *Savanilla Rhatany* will justify the opinion that it is derived from a new species of Krameria, and not the result of differences of climate and soil on Krameria triandra, that opinion is further supported by the difference in the anatomical structure of the two roots, which of itself indicates a specific difference.

The three layers of bark may be easily distinguished in both species. Their relative thickness varies; in the Peruvian root the endophlœum is most developed, but in the Savanilla root the mesophlœum is almost as thick as both the other layers together. Savanilla Rhatany is covered by a transparent structureless epidermis, which, however, in most specimens is lacerated, and underneath the cuticular layers is of a deep brown colour. By treating a very thin section with diluted solution of ammonia, I was enabled to observe their concentric depositions. A drop of alcohol discoloured the interior layer quicker than the darker outer rings. By moistening a thin transverse section of both roots, the epidermis and cuticular layers of Savanilla Rhatany could be seen tightly to enclose and to adhere to the pomegranate red external cortical portion, resembling herein the reddish-brown layer in Payta Rhatany. A section of the woody part of the latter root, when moistened and viewed with a magnifying glass, appears of a pure yellow colour, intersected by vessels and intercellular canals; but the wood of Savanilla Rhatany is dark yellow, and with its radiating red intercellular canals, and numerous regular bundles of vessels transmitting the light, presents a much prettier appearance.

With regard to the structure of the three layers of bark in Savanilla Rhatany, we find that the epiphlœum consists of only a few overlapping, elongated, parenchymatous cells, filled with a dark yellowish-brown colouring matter, the most external layer being the smallest of all. The form of each cell is regularly hexagonal. Close to this outer portion adheres the meditullium, consisting of parenchymatous tissue, with short six-sided cells and numerous intercellular canals, containing colouring matter. All this together forms a firm tissue. The colour of the cells is golden-yellow; the irregular triangular interspaces are filled with a dark reddish-brown matter. The exterior of almost all the cells has the same colour, which indicates that they afford communication between the larger interspaces. The cells contain a colourless starch, the granules of which do not differ very much in size.

The endophlœum consists of a colourless parenchyme, with smaller and considerably longer cells than those of the mesophlœum. The intercellular spaces are filled with the same matter, but much less in quantity, and here and there a few prosenchymatous elongated cells, with thick walls, may be distinguished by their wine-yellow colour. We will now describe the bark of the root of Peruvian Rhatany. The epidermis and external cortical layer are identical with those of Savanilla Rhatany. The mesophlœum consists of small, elongated, overlapping, closely-packed cells, filled with starchy, parenchymatous matter. The form of the cells is somewhat irregularly six-sided; large intercellular canals are not frequent; when present, they are always smaller than those of Savanilla Rhatany, and filled with a golden-yellow colouring matter. The endophlœum is composed of narrow, colourless, very elongated parenchymatous cells, with thick walls, the interspaces being filled with dark yellow colouring matter. The mesophlœum of Savanilla Rhatany is characterised by numerous triangular intercellular spaces, which are almost entirely absent in Peruvian Rhatany, while in the latter we find many elongated, intercellular spaces, filled with a yellowish colouring matter, which in fact are so numerous that each larger cell seems as if surrounded by a yellow circle. Both roots correspond in the slightly different coloured matter, filling very uniformly the intercellular spaces. A granular or partially indurated deposition I observed nowhere.

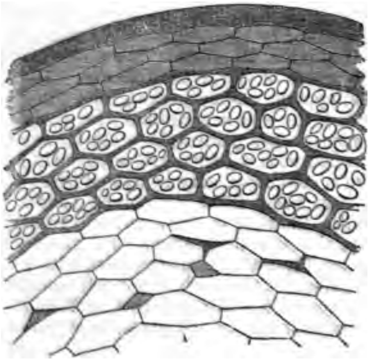
A comparative examination of the woody portion of both species shows but very slight differences. They are composed of closely packed, elongated, dotted prosenchyamatous vessels with thick walls, interspersed with air canals and numerous small, sometimes branched, intercellular spaces, filled with a brownish-red colouring matter. In the centre of the woody portion of Peruvian Rhatany, the coloured intercellular canals are only few in number, but on the outer side, where the broadest and thickest prosenchyma represents, so to say, the meditullium, the intercellular canals are more frequent, but irregular, and without any colouring matter. In the interior of the woody portion of Savanilla Rhatany they are very scarce and single. In a section of the new root, the coloured intercellular canals running in an horizontal direction appear more connected and branched, radiating in brown lines from the centre; in the Peruvian Rhatany they expand in the same direction, but are separated from each other by distinct intervals, consisting of colourless prosenchymatous matter. Besides these distinct rays, we find in the wood of Savanilla Rhatany concentric annual rings, which by their darker shade augment the red-spotted appearance of the root. A distribution of colouring matter is therefore almost entirely absent in this root, but instead of it we find uniformly distributed over the whole, large, almost circular spaces, which are absent in the new root. Both correspond in the arrangement of the radiating intercellular spaces (which might almost be compared to medullary rays); these are not always regular, but sometimes only present on one side, or appear curved on both sides. A longitudinal section shows that the woody portion of Peruvian Rhatany contains more spotted vessels than Savanilla Rhatany. The layers which thicken the prosenchymatous vessels vary, but are similar in both roots. They are either evenly deposited on the interior wall of the cells, or the deposits differ in different places in thickness, giving to the interior an irregular undulated appearance.

In the centre of the meditullium of Savanilla Rhatany, the coloured intercellular canals are very frequent, of large size, and appear greatly compressed; this must account for the colouring matter, which sometimes is found in the interior of some of the tough wood cells, the walls having given way to the pressure of the colouring matter which forced its way between the small overlapping ends of these cells.

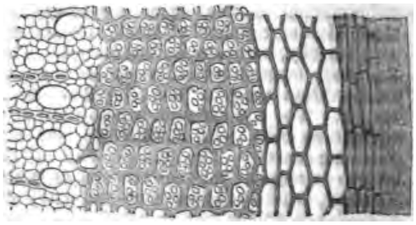
I may further mention a somewhat rare case in the deposition of colouring matter. I observed in a longitudinal section made from the woody portion of Peruvian Rhatany, that the pores of some of the vessels were coloured with the matter contained in the intercellular canals, and when moistened with a drop of alcohol the colour disappeared, and the pore remained perfectly colourless.

By treating a watery infusion of the wood of the roots with acetate of lead, sulphate of iron, or lime water, the Savanilla Rhatany gives a much more abundant precipitate than the Peruvian, which indicates that the amount of astringent matter in the wood of Savanilla Rhatany is larger than in Peruvian Rhatany. The same result is obtained with infusions of the bark, but here we find in the new root a peculiar strongly bitter taste, which is not observed to the same extent in Peruvian Rhatany.

I regret that I was unable to examine microscopically the Rhatany from the Antilles. According to Guibourt it occurs in short unbranched pieces, covered with a white epidermis.



Transverse section of the bark of
Savanilla Rhatany.



Transverse section of the bark of
Payta Rhatany.

Savanilla Rhatany must not be condemned on account of its greyish unfavourable appearance. On the contrary, it is a very good kind of Rhatany root, and deserves to be greatly recommended. Some experiments I made for Messrs. Gehe and Co., of Dresden, proved that in amount of extractive matter it surpassed Peruvian Rhatany, that the extract is of a finer colour, and in chemical and medicinal properties was identical with that of the old sort of Rhatany.—*Botanische Zeitung.*

COMPOSITION AND ANALYSIS OF MILK.

The chemical examination of milk discovers in it an oily matter, butter, and a saccharine substance, the sugar of milk, a nitrogenized flesh-forming compound, caseine—which has the same composition as the fibrin of wheat, the phosphates, from which bone is built up, and the saline compounds which exist in blood. It is shown to be a store richly furnished with the raw material of beef and blood, fat and bone. The proportions in which these materials exist in the milk of different animals is found not to be the same, and, as is well known, both the quality and quantity of cows' milk are subject to considerable variation. The following analysis of cows' milk will show its usual composition. No. 1 gives the average composition of samples of milk analyzed in France; Nos. 2 and 3, of milk supplied to the union workhouse, Belfast, and examined in my laboratory; No. 4, of cows' milk; and No. 5, of human milk, examined in Germany by Haidieu (*see* Table). The caseine in milk is held in solution by soda, but the butter is merely suspended through it in a finely divided condition; milk, in fact, resembles an emulsion, in which a thin, colourless, and transparent liquid is rendered opaque, and of a white colour, by the suspension in it of extremely minute particles of fatty matter:—

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Water	87.40	90.18	90.67	87.3	89.2
Caseine and Insoluble Salts	3.60	3.40 0.37	3.45 0.36	5.1	3.1
Butter	4.00	2.30	3.27	3.0	3.4
Sugar of Milk Soluble Salts	5.00	3.51 0.24	2.08 0.17	4.6	4.3

One of the most important constituents of milk, with reference to its value for human food, is the nitrogenized substance caseine. The proportion of this compound is found to be influenced by the kind of food supplied to the animal, and to be increased by substances rich in nitrogenized compounds. According to Boussingault, the average amount in cows' milk ranges from three to four per cent. Other observers have, however, given a much higher average, Playfair, in England, estimating it at 4.16, while Simon, in Germany, raises it to seven per cent.

In milk caseine exists in two conditions, partly in solution, and in part forming transparent capsules which invest the globules of fat and keep them from coalescing, as occurs when they consolidate into butter. The existence of a delicate membrane investing the fat globules, which was asserted to exist by the French chemist, Raspail, was not, until lately, demonstrated. If a thin layer of fresh milk be spread on a piece of glass, and examined by the microscope, it is observed, like blood, to be composed of minute capsules or globules, swimming in a colourless and transparent liquid. These globules consist of the oily matter of the milk, surrounded, as I have said, by a capsule of caseine. The microscope, however, does not show us this transparent investing membrane until chemical means, as a few drops of acetic acid, are also employed in the investigation, when the globules become distorted, and drops of fat can be seen emerging from them.

The chief method adopted in this country for the examination of milk is by the measurement of the quantity of cream which it is capable of affording. For this purpose a simple instrument, termed a lactometer, or milk gauge, is used, which consists of a table and narrow glass, usually about ten inches in length, and an inch in diameter, and graduated into 100 equal parts, the scale commencing at the top of the glass. When milk is poured into the glass to the first mark, and allowed to remain at rest for twenty-four hours, it will be found that the cream, at the expiration of that time, has separated, forming an opaque layer on the surface of the milk. The thickness of this layer, measuring from the division where the opacity commences to the surface of the cream, is ascertained by reference to the figures engraved on the side of the glass, and the number of degrees observed indicates the percentage of cream in the milk. A number of these tubes are required for use in the dairy, and may be conveniently placed in a wooden stand, so as to admit of the comparative examination of several samples of milk; they may be procured at the glass-house, or from any manufacturer of chemical apparatus. Though this form of instrument is recommended by its simple construction, and the apparent accuracy of its indications, yet, to obtain perfectly correct results, several precautions are necessary, and even when properly employed its results are to be regarded as only comparative. It affords us no information with respect to the proportions in which the caseine and other constituents of milk are present, and gives us merely an approximation to the actual amount of cream which the milk contains. From the circumstance that the lactometer is at present very generally employed in this country, and that it has been adopted in estimating the quality of the milk supplied to the workhouses, it will be useful to consider the causes which influence the accuracy of its indications.

1. When milk is taken from the cow and placed in the collecting pans it has no sourness; but very soon it becomes slightly sour, and it is found that the production of acidity is promoted by whatever elevates the temperature of the milk. The quantity of acid gradually increases so much that it coagulates the caseine, and when the souring of the milk is quickly produced, from the vessels containing traces of sour milk, or from an elevated temperature of the season or of the milk-room, it will usually be observed that the amount of cream separated will not be so great as when the souring and consequent coagulation is retarded. The spongy mass which the coagulated caseine forms entangles some of the particles of cream, and prevents their ascent to the surface of the milk. The influence, therefore, which the slow or rapid coagulation of milk exercises in promoting or retarding the separation of the cream enables us to explain the discordance in the results obtained in the use [of the ordinary milk gauge, and shows us how much the percentage of cream, as indicated by the tube in a sample of milk, may depend upon the rapidity or slowness of its coagulation. It also explains the beneficial effects of the practice of keeping the milk in shallow vessels at a moderate temperature, so as to avoid its becoming too rapidly sour, and to favour the more easy ascent of the butter globules. You can readily understand, from the statement just made, how it may sometimes happen that a sample of fresh milk placed in the tube immediately after milking will yield a larger percentage of cream than the milk from which it has been taken when examined after it has been carried for several miles and exposed to the action of the air, and also agitated in contact with the air contained in the milk vessels, and probably brought into contact with vessels containing some traces of acidity.

2. It is a fact well known to milkers that the last portion of the milk drawn from the udder is much richer in butter than that which is first drawn, while the other constituents maintain the same relative proportions. A merely mechanical cause is commonly assigned for this difference of composition by agricultural writers, and you will find it stated that it is to be ascribed to the fatty matter accumulating upon the surface of the milk in the udder, while the more dense watery portion will be collected in the under part, and consequently be first drawn away.

But this explanation is no longer admissible, as it has been found by experiment that the same thing prevails with respect to woman's milk drawn in fractional portions from the breast. As, however, the fact is certain that the milk which is last drawn is invariably richer in cream than that which is first drawn, it is obvious that in proceeding to estimate the amount of cream which the milk of a cow is capable of affording, our samples should be taken from the entire quantity of milk obtained, after taking care to thoroughly mix together the various portions.

From the observations which have been made, the following practical conclusions with respect to the use of the lactometer may, I conceive, be drawn. 1st. That it affords purchasers a very uncertain method of calculating the actual value of milk, as its indications are influenced by temperature, and also by the changes which the milk may have undergone when brought from a distance. 2nd. As it is incapable of indicating the amount of the valuable muscle-forming caseine, or of the sugar and saline matters which are essential constituents of milk, it cannot be regarded as affording us information with respect to the actual value of milk as an article of food.

3. That as the thickness of the layer of cream which a sample of milk may throw up in a given time will be influenced by the length of the tube, the temperature to which it is exposed, the portion of the milk examined, and the influence of mechanical and chemical causes, it cannot be regarded as indicating correctly the actual richness of the milk in cream; and it follows that the purchaser is not entitled to consider a

sample of milk as deficient in cream, even when it fails when tested in the workhouse to give the same percentage as when examined by the contractor.

The second method of distinguishing the value of milk is based upon the fact, that opacity of milk depends upon the corpuscles of fatty matter which are suspended in it, and that consequently the more cream it contains the greater will be the obstacle opposed to the passage of the rays of light. An ingenious but rather expensive instrument, called a lactoscope, has been invented in Paris, by Donne, for the purpose of accurately determining the degree of transparency which the milk possesses. The lactoscope consists of two tubes, one of which may be pushed into the other like the joints of a telescope, and the end of each tube is closed with glass, so that when milk is poured into the outer tube by a small opening on the side, by pushing in the inner tube, a layer of milk of any thickness may be obtained. The apparatus is placed on a stand. The value of the milk is estimated by the thickness of the layer of it through which the light of a small wax taper at a fixed distance can be observed, the value of the milk being in the inverse ratio of the transparency; the larger the amount of fat present, the greater, of course, will be the opacity. The thickness of the layer of milk is measured by a scale on the instrument, and a table sold with it shows the percentage of cream to which it corresponds.—*Journal of the Chemico-Agricultural Society.*

ENGLISH OAK GALLS.

BY DR. VINEN.

Much interest has been excited by the frequent occurrence in this country of the galls of *Cynips Quercuspetioli*, and they appear, from a recent communication in the *Gardeners' Chronicle*, to have increased to such an extent during the past season, as to do vast mischief to the trees infested by them, rendering them unproductive of acorns, and even threatening their entire destruction.

In a recent conversation with Mr. Westwood on this subject, he informed me that these galls had been used in Devonshire for the purpose of making ink, and at the same time suggested that it would be desirable to know whether they contained sufficient tannin to render them useful substitutes for the ordinary galls of commerce. At his request I undertook to ascertain this, and thought the result might be sufficiently interesting to communicate to the Society: the following is the result of my examination. By macerating 100 grains of Devonshire galls in æther and water, a residue was obtained weighing 26.74 grains: this contained seventeen grains, or about two-thirds of tannic and gallic acids. In order to estimate the comparative value of these galls with those of commerce, 100 grains of best Aleppo galls were submitted to the same treatment with æther and water. The residue weighed 58.50 grains, containing fifty-six grains of tannic and gallic acids. Of the superiority of the foreign galls there can of course be no doubt; but in comparing the results of these two analyses, it is necessary to observe, that the Aleppo galls operated on were very heavy specimens of the best kind of galls of commerce, and that they had not been perforated by the *Cynips*, while the Devonshire galls had all been perforated, and therefore contained a much smaller proportion of tannin than would have been the case if they had been examined at an earlier period. If we compare the published analyses of nutgalls, considerable difference will be found in the quantity of tannin obtained by different chemists. The following are the principal:

Sir Humphrey Davy found	26	per cent.	of tannin.
Pelouze..............	40	"	"
Leconnel........................	60	"	"
Guibourt........................	65	"	"
Mohr............................	72	"	"
Buchner	77	"	"

However widely these results may vary, they are entitled to every credit; and high as are those of the two last-mentioned chemists, their well-known accuracy will ensure entire confidence in their statements. I am inclined to think that these great discrepancies are owing to accidental causes, among which the variable nature of the seasons, which influences so much the quantity and intensity of all vegetable secretions, may be a principal one. With the small amount of tannin found in the Devonshire galls I must confess myself much disappointed, but I hope in the ensuing summer to procure some of them at an earlier period, and before they have been perforated by the *Cynips*. I have no doubt that they would then be found to contain enough tannin to justify their being collected for commercial purposes, and if they were gathered at the proper season, before the *Cynips* has escaped, and when the gall is in its most vigorous and valuable state, another good result would follow. The insect would be prevented from increasing to what seems to be a mischievous extent, and a check would be put to the serious injury, if not entire destruction, with which the oak plantations in some of our southern counties appear to be threatened.—*Journal of the Linnean Society.*

SILVERING AND GILDING GLASS.

LIEBIG* has published the results of some experiments, undertaken for the purpose of devising a method by which glass may be coated with silver at the ordinary temperature, and with a view to the production of mirrors free from defects, for optical purposes.

The silvering liquid that was found to answer this purpose is an ammoniacal solution of nitrate of silver mixed with caustic soda or potash. This liquid, when brought into contact with a solution of milk sugar at the ordinary temperature, deposits silver upon the surface of glass.

For the preparation of this liquid, ten grms. of fused nitrate of silver is dissolved in 200 cub. cent. water, as much ammonia added as may be requisite to obtain a clear solution, which is then mixed with 450 cub. cent. potash solution (sp. gr. 1.05), or with the same volume soda solution (sp. gr. 1.035). When the addition of the alkaline solution produces a dark-brown precipitate, ammonia must be added at once until this precipitate is redissolved. When the whole of the potash or soda solution has been added, the liquid is diluted with water to the volume of 1450 cub. cent., and to it is added, drop by drop, a dilute solution of nitrate of silver, until a decided and persistent grey precipitate appears, and then water is added, to the volume of 1500 cub. cent. A cubic centimeter of the liquid will contain rather more than 6.66 mgrm. nitrate of silver, or 4.18 mgrm. silver. For the production of a perfect mirror, it is essential that the liquid should not contain any free ammonia, the whole of the ammonia must be saturated with oxide of silver. For the purpose of this saturation, a portion of the nitrate of silver solution may be reserved and added afterwards; in this case, a cubic centimeter of the liquid will contain rather less than 4.18 mgrm. silver.

The potash or soda solutions must be free from chlorides.

Immediately before using this liquid for silvering, it is to be mixed with $\frac{1}{10}$ or $\frac{1}{8}$ its volume of a solution of milk sugar in ten parts of water.

The silvering of small concave or convex glasses is not attended with any difficulty. To the back of the glass is fastened, by means of a resinous cement, a rod or a brass hook, by which the glass may be suspended over a suitable glass or porcelain vessel, so that there may be an interval of about half an inch between the surface to be silvered and the bottom of the vessel. The liquid, previously mixed with the solution of milk sugar, is then poured into the vessel so as to cover the whole surface to be silvered.

For preparing plane mirrors, troughs made of gutta percha are recommended, and the glass plate is supported upon small cones of gutta percha at the corners.

The deposition of silver should always take place at the surface of the liquid, and not at the bottom.

The reduction of the silver takes place immediately after the alkaline silver solution is mixed with the milk sugar solution, and the mixture at once becomes dark coloured. The immersed glass appears black after a few minutes; within a quarter of an hour it becomes bright, and the reduction is complete when the liquid between the edge of the glass and the side of the vessel is covered with a white shining film of silver. The whole of the silver is precipitated from the solution and only a small portion of it remains attached to the glass.

An exact estimation of the silver adhering to a mirror, whose surface was 226 square centimeters, showed that it amounted to forty-nine milligrammes. Consequently the silvering of a mirror, with a surface of a square meter, would require

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[*] *Annalen der Chemie und Pharmacie*, xcviii., 132.

2.210 grms. silver—about fivepence in value. The quantity of liquid requisite for silvering a surface of 226 square centimeters is 280 cub. cent., containing about 1170 mgrm. silver; so that 1121 mgrm. silver (=1170—49) is precipitated in and upon the vessel. This must be collected afterwards, and converted into nitrate.

After the glass has been silvered, it is removed from the liquid, washed with warm distilled water, and dried in a warm place. Great care must be taken not to injure the film of silver in removing the glass from the liquid and washing it. After drying, the film of silver adheres so firmly to the glass, that there is some difficulty in removing it by the finger.

When the glass has been coated in this manner at the surface of the liquid, the film of silver is very uniform throughout, and, when carefully polished with fine rouge and velvet, becomes a perfect mirror.

One of the greatest difficulties encountered by Professor Liebig consisted in cleaning the surface of the glass to be silvered; but he is of opinion that this is not insurmountable.

It is necessary that the bottom of the vessel containing the silvering liquid should be throughout equidistant from the surface to be silvered, otherwise the film of silver is of unequal thickness, and appears darker at some parts than at others.

Uniform contact of the glass and the silvering liquid is also an essential condition for the production of a perfect mirror. The smallest bubble of air adhering to the glass gives rise to a hole in the film of silver. Professor Liebig found it advantageous to moisten the surface of the glass with alcohol, previous to immersing it in the silvery liquid.

When the glass plate lies at the bottom of the vessel containing the silvering liquid, it is quite as completely covered as when it is suspended at the surface; but then the whole of the silver is precipitated upon the glass plate in the state of a grey powder, which for the most part adheres so firmly, that it cannot be removed without danger of injuring the mirror.

Before enclosing the mirror in a frame, it should be covered with a thin colourless varnish, in order to protect the silver film from injury. A solution of dammar resin in alcohol is well adapted for this purpose.

Dr. Löwe* has also published some remaks on the silvering of glass. In experimenting on this subject, he found, as Professor Liebig had done, that in producing the silver film by means of a liquid containing caustic potash or soda, the absence of chlorides and carbonates is essential; and as the preparation of caustic potash or soda free from these substances is attended with difficulty, and would be costly upon the large scale, he relinquished the attempt to apply this method. The liquids which he employs are an ammoniacal solution of nitrate of silver, and a solution of grape sugar with lime; 7 grm. fused nitrate of silver dissolved in 150 or 160 parts of water, and mixed with the ammonia, any excess of which is afterwards removed by a few drops of neutral solution of nitrate of silver. The reducing liquid consists of 50 grm. grape sugar, dissolved in 5000 parts of water, and gradually mixed with 20 grm. pure caustic lime; the whole being shaken in a stoppered bottle, or warmed until the lime is dissolved, then filtered out of access of air, and preserved in a well-closed vessel.

For the purpose of silvering, the silver solution is mixed with six times its volume of the grape sugar solution; but previously the surface to be silvered is wetted with the silver solution. Dr. Löwe is of opinion that the production of the mirror in this way requires the liquid to be slightly agitated while pouring in the sugar solution, otherwise the whole of the silver is deposited at the bottom of the vessel containing the liquid, or the film of silver obtained when the liquid is at rest is too thin, and appears dark-coloured. This is less likely to occur when the liquids are more concentrated. The film of silver is deposited somewhat more slowly than when a liquid containing caustic potash or soda is used, but Dr. Löwe states that the mirror appears to have a greater coherence than that produced by the latter method, and is less liable to be injured while being washed with water.

The gilding of glass durably and brilliantly, Professor Liebig† finds can be effected only with the aid of heat. The film of gold produced at the ordinary temperature has a fine colour and lustre, but it does not adhere to the glass with sufficient firmness not to be removed by washing.

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* *Polytechnisches Journal*, cxl., 204.

† Loc. cit., p. 187.

The gilding liquid is prepared by dissolving gold by nitro-hydrochloric acid, adding to the solution, for each gramme of gold, 0.292 grm. chloride of sodium, and evaporating to dryness so as to remove all excess of acid. The residual double chloride is then dissolved in so much water that 100 cub. cent. of the solution will contain 1.0 grm. of gold. 50 cub. cent. of this gold solution is then mixed with 20 cub. cent. caustic soda solution (sp. gr. 1.035) and 300 cub. cent. water, heated to the boiling-point, and reduced, by evaporation, to 250 cub. cent. Another liquid prepared by mixing 50 cub. cent. of the gold solution, with 20 cub. cent. caustic soda, and 230 cub. cent. water, is placed for an hour in a vessel of boiling water. These two liquids are then mixed, and are ready for gilding.

When a glass vessel is to be gilt inside, a quantity, equal to $\frac{1}{10}$th its contents, of a mixture of 100 parts of alcohol and one part ether, is poured into it, and the remaining space filled with the hot gilding liquid. The vessel is then placed in water at a temperature not higher than 176° F. Within ten or fifteen minutes, the surface of the glass is covered with a brilliant film of gold, and when the sides appear opaque, or of a dark green colour by transmitted light, the vessel is removed from the hot water.

The alkaline gold solution is always reduced by the alcohol under the conditions above described, but the glass is coated with a film of gold only when the liquid is of such a nature, that the adhesion of the gold and glass is somewhat greater than the adhesion of the gold and water. In the former case the gold is deposited only upon the glass; in the latter case it is only precipitated from solution. There is great difficulty in securing exactly this condition, and the reason of a failure is not always apparent.

The gilding liquid is serviceable only while fresh, and after twenty-four hours is no longer fit for the purpose. While in the condition requisite for gilding, the liquid has a faint tinge of yellow; when kept for some time, it becomes colourless, and then the gold is reduced by alcohol only with great difficulty.

A patent has been taken out in England by an American, named Hill, for a similar method of silvering glass. The silvering liquid is prepared in the same manner as those used by Liebig and Löwe. The reducing liquid is made with sixty-two ounces of water, five grains mannite, one drachm sulphuric ether, and one ounce of grape sugar.

TESTING OF VARIOUS ORGANIC SUBSTANCES BY CHROMATE OF POTASH AND SULPHURIC ACID.

BY M. EBOLI.

According to M. Eboli, Professor of Chemistry and Mineralogy at the Academy of Medicine in Lima, the behaviour of organic substances towards chromic acid and sulphuric acid may be employed for their detection. The process may be employed in chemical jurisprudence.

It is as follows:—1 to 2 milligrms. of the substance to be tested are put into a watch-glass, and 5 to 6 drops of sulphuric acid, diluted with its weight of water, are let fall upon it. A small fragment of chromate of potash is then laid in the fluid, and the colourations produced are carefully observed. Each change of colour lasts for some hours.

Morphia.—Nickel-green; then copper-green; lastly, dark dingy green.

Sulphate of Morphia.—Nickel-green; then copper-green; finally, dark yellow.

Acetate of Morphia.—Nickel-green; then copper-green; lastly, bluish-green.

Quinine.—Scheele's green; then a fine yellowish-green; lastly, dark green.

Sulphate of Quinine.—Nickel-green; then copper-green; lastly, dingy yellow.

Ferrocyanate of Quinine.—Dingy green; afterwards leaf-green; then dingy yellow; and finally, chocolate colour.

Cinchonine.—Scheele's green; then a fine yellowish-green; finally, a dark dingy yellow.

Sulphate of Cinchonine.—Scheele's green; then copper-green; and lastly, dark dingy yellow.

Veratrine.—Dingy green; then bottle-green; then nickel-green and turbid, becoming clear subsequently; afterwards, copper-green and turbid; and lastly, dark dingy yellow.

Atropine.—The first tint, nickel-green, only appears in the course of a few minutes;

it then passes to yellowish-green; and lastly, becomes dingy greenish-yellow, letting fall a yellowish precipitate, which is soluble in alcohol.

Delphinine.—Dingy green; then clear, and afterwards turbid, nickel-green; finally, dingy yellowish.

Lupuline.—After some time greenish-yellow and turbid; finally, dingy greenish-yellow.

Codeine.—Scheele's green; then nickel-green; afterwards copper-green; and finally, dark dingy green.

Daturine.—Copper-green; lastly, greenish-blue.

Strychnine.—Very intense violet, almost black at the points of contact; then yellowish-violet; lastly, in two days, blue. The violet reaction has already been observed by Graham and Hofmann, but the subsequent changes of colour have not hitherto been noticed.

Caffeine.—No reaction.

Naphthaline.—No reaction.

Piperine.—Yellowish-green; then nickel-green; lastly, dingy green.

Cantharidine.—With this, concentrated sulphuric acid must be employed, and it must be heated nearly to boiling over the spirit-lamp. The flame is then removed, and the chromate of potash put in, when a brisk effervescence takes place, and a splendid green mass is produced, which dissolves in the course of a few hours, and finally becomes of a turbid leaf-green colour.

The author intends submitting another series of organic bodies to the same test. He remarks, in conclusion, that it will not do to substitute a solution of chromate of potash for the crystallized salt. With a solution the reaction takes place so instantaneously, that it is impossible to follow the changes of colour.—*Messagero de Lima*, *Archiv der Pharm.*, cxxxv., p. 186; and *Chemical Gazette*, July 1, 1856.

EXPLOSIVE ACTION OF SODIUM ON WATER.

BY FREDERICK W. GRIFFIN, PH.D.,

Director of the Bristol School of Chemistry.

The action of sodium on water contained in a glass vessel is such an elegant proof of the composition of that liquid and other points, as to lead to its being occasionally introduced in lectures. I have, however, found the experiment liable to a grave accident, which ought altogether to banish it from public demonstrations. Some years ago, during my private course of lectures, I passed a piece of the metal, about a quarter of an inch square, into a tube filled with water, eighteen inches in length by one in diameter. When the action was nearly over a powerful explosion occurred, which forced the tube (weighing upwards of a pound) violently through my hand, and dashed it to pieces against the ceiling. As I had often before performed the experiment with perfect safety, I presumed that air must have somehow got mixed with the hydrogen; the more so as, simply holding the sodium in my fingers, I had, to slip it under more quickly, brought the mouth of the tube very near the surface of the water. On all subsequent occasions I placed the sodium in a little tube closed at one end, which it almost filled, and stopping the mouth with the finger, opened it below the larger tube, which was kept at least a couple of inches under water, so that there was no possibility of letting in air by any sudden jerk or otherwise. All went off well for several times, till at a public lecture in Devonshire an explosion resulted more violent than the first, and the tube was blown into splinters, which strewed the floor of one half of the room, and slightly wounded several persons. Since that occurrence I have relinquished showing this experiment in public at all, though numerous trials appear to prove that a piece less than a pea may be used with safety, though there is sometimes a slight concussion at the end. The cause of the detonation remains to be explained. In the last instance, at any rate, it is quite certain that no explosive mixture with air was formed, and I have little doubt that the effect proceeds from the water round the sodium being thrown into the *spheroidal state*. This view seems confirmed by the fact that at the first moment of contact a large quantity of gas is always liberated, but the action speedily becomes weaker, and the evolution of hydrogen extremely slow. In all probability the metal is then merely decomposing the atmosphere of aqueous vapour around it; and when the piece is small it disappears tranquilly in this way; when it is larger, so that the action is prolonged, its temperature slightly falls, contact ensues, and a burst of gas and steam takes place with explosive violence. In both cases the tube was three-quarters full of gas, and I noticed a sudden downward rush of the liquid the moment before the explosion.

The detonation, with occasional fracture of the vessel, observed by Wagner and Couerbe* to take place when sodium floating fused on water is struck with a spatula, probably proceeds from the same cause, the highly heated globule being forced mechanically into sudden intimate contact with the liquid.

While on the subject of sodium, I may add that when it is melted with a little naphtha in a sealed tube containing no air, it presents to the full extent the high lustre and mobility of mercury, from which, indeed, it cannot be distinguished by the eye; but as soon as it solidifies, it assumes a slightly crystalline and dead white surface more nearly resembling frosted silver.—*London, Edinburgh, and Dublin Philosophical Magazine.*

ON SOLUTION OF GUTTA PERCHA.

BY J. M. MAISCH.

Collodion, when applied to the skin, contracts it, and is objectionable in many cases for this reason. For the removal of its contractile power, and to impart more softness and elasticity to it, the addition of several substances has been proposed, and the admixture of some colouring matter to imitate the colour of the skin. Since Dr. Graves proposed a solution of gutta percha in chloroform, for the treatment of certain diseases of the skin, in place of collodion, the former has been tried by physicians, and some are using it now very extensively. Being desired to prepare some, I followed the process of Dr. Geiseler, which was published in the *Archiv. d. Pharm.*, July, 1855. One part gutta percha is to be dissolved in eight parts spirit of turpentine, the solution filtered and mixed with alcohol of 90 per cent., until a precipitate ceases to appear, which must be boiled successively with alcohol and water, and afterwards well dried. Of this purified gutta percha, one part may be dissolved in twelve parts of chloroform, when a clear, almost colourless solution is obtained, which has a faint smell of turpentine.

In following these directions strictly, I found that a large quantity of alcohol is necessary to precipitate the gutta percha, of which the filtered or decanted liquor deposits another quantity after standing for several days; the colouring matter is precipitated along with the gutta percha, and, though it was always deposited underneath the latter, still it wanted a mechanical separation, and some loss of the white gutta percha was unavoidable. The process of washing it by boiling in alcohol and water is tedious, as it strongly retains some turpentine, which, though faintly, may be smelt in the chloroform solution. This solution, on standing a day, separated some white scum like cream above the milk. By this observation I was induced to try another way for preparing a light and clear solution, and was successful with the following very simple process:—One part of the best commercial gutta percha was cut into small pieces, and by agitation dissolved in twelve parts of chloroform; on standing for a day all the colouring matter rises like scum to the surface, leaving the solution as clear as Dr. Geiseler's; this may then be easily drawn off to the last drop. A wide glass tube, narrower at the bottom, and so arranged that both ends may be closed by corks, is the only instrument necessary. After the separation is complete, the upper cork must be removed and the lower one loosened, so as to allow the liquid to run out slowly. Thus prepared, the only loss will be some chloroform, which is insignificant when compared with the loss of material and time of Dr. Geiseler's method. The advantages of this solution over collodion consist in the absence of the contractile power and gloss of the latter, and in the close resemblance to the skin in appearance and elasticity.—*American Journal of Pharmacy.*

SOLUBILITY OF BONE IN WATER.

Wöhler† finds that when powdered bone is left for some time in contact with water, an appreciable amount of phosphate of lime and phosphate of magnesia is dissolved. The same result is obtained when the water used has been deprived of carbonic acid by long boiling. When water was filtered through bone-powder continuously during a month, these phosphates could be recognized in each successive portion of the filtrate; and the amount appeared to become greater in proportion as the organic substance meanwhile became putrescent.

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* Gmelin, *Handbook* (Cav. Soc.), vol. iii. p. 75. Berzelius, *Traité*, vol. ii. p. 83.

† *Annalen der Chemie und Pharmacie*, xcviii., 148.

SYRUPUS FERRI IODIDI.

(EXTRACT OF A LETTER FROM MR. SOUTHELL.)

I AM rather surprised that the formula of James Houlton for Syr. Ferri Iodidi in the June number of the *Pharmaceutical Journal* has been allowed to pass without remark, as the proportions are not those of any authorized formula, each of the Colleges ordering a quantity of iodine equivalent to 384 grains to twelve fluid ounces of the syrup, whereas J. Houlton directs only 252 grains to be used. It would not of course be right to use such a preparation for dispensing prescriptions without correcting the discrepancy.

J. Houlton's syrup......contains about 26 grains of iodide of iron per fluid ounce
The syrup of the Colleges " " 40 grains of ditto per ditto
Birmingham, 7th July, 1856.

[Mr. Houlton appears to have adhered to the original formula of Dr. A. T. Thomson, who recommended the preparation. The College of Physicians, in introducing it in the Pharmacopœia, altered the strength. It has in several other cases been remarked that the College in adopting a formula or preparation well known previously in the profession, have made some alteration in the name or composition. Whether this circumstance has arisen from a desire to avoid plagiarism, or from professional etiquette, it is attended with inconvenience, as the preparation so introduced, although differing in some respects, is taken to represent the original.—ED.]

LIQUOR COTYLEDONIS UMBELLICI.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—In reply to an answer to a correspondent from Liverpool, I beg to inform you that there are other makers of the *Liquor Cotyledon. Umb.* besides Mr. Davenport, and that I am one of them. I think it unfair on your part to select *one* out of the many who advertise. I am, Sir, yours respectfully,

15, *Crawford Street.* FREDERICK CURTIS.

[We do not undertake to keep a register of all nostrums which are advertised. As a general rule, such advertisements are not admitted on the cover of this Journal. In answering correspondents, we endeavour to give the information required, without pretending to furnish a complete list of all the persons who make or sell any article that may be the subject of inquiry.—ED.]

STATE OF MEDICINE IN PERSIA.

THE following illustration of the state of medicine in Persia and Afghanistan is extracted from General Ferrier's *Caravan Journeys and Wanderings* in those countries:—

"The Sertip's visit was followed by those of several men of rank; after them came the *Hakim bashee*, doctors, who hold a high rank in the society of Herat. Amongst them were Mirza Asker, Mirza Mahommed Hussein, Goolam Kader Khan, and Agha Hussein, the ancient adviser of the Shah Kamran. As in their eyes every European must be a doctor, the conversation never ceased running on the healing art, of which they considered themselves such distinguished professors; each in turn was anxious to give me a high opinion of his talent, and I was condemned to listen to a long and absurd display of Afghan erudition. They also brought with them some of their drugs, in order that I might give them some notion of the manner in which certain chemical preparations which they had received from British India should be employed, as they were ignorant of their effects. They had, they said, up to that time given these medicines in progressive doses, until they ascertained the cases to which they were applicable. How many of their unfortunate patients had been killed by this system I dare not ask; but Mirza Asker filled up the blank by pulling from his pocket a bottle of the cyanide of mercury, requesting to know what devil of a salt this could be? 'It has been of no use to me,' he added, 'for of one hundred patients that I have given it to only one was cured—all the rest died.'

"Having finished with medicine, alchemy had its turn; for some of these idiots spend all they possess in their search after the philosopher's stone. They are convinced that the English have found it, and attribute their riches to that discovery. They imagine all European gold coins are at the outset only bits of iron, rubbed with a certain preparation, and then placed in devil's water from some well or spring, which metamorphoses it into gold. The doctors entreated me to initiate them into the secret; but I could only in a most learned discourse refer them to humanity, civilization, political economy, and the rights of man, assuring them that it was only to these and our principles of order and justice that we owed the riches they envied us. This they would not believe, and from that moment conceived the highest opinion of my diplomatic talents, admiring the cleverness with which I eluded their pressing and repeated inquiries."

REPORT OF THE COMMITTEE ON STANDARDS FOR DRUGS.

TO THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The Committee appointed to continue the subject of "Standards of quality for those drugs capable of them, together with appropriate tests for detecting adulterations," respectfully report, that some time after the last annual meeting, the Chairman of the Committee communicated with the several members, and after due consideration, the conclusion was arrived at by a majority of the Committee, that they could not prepare a report that would correctly answer the resolution under which they were appointed, without a sacrifice of time and application incompatible with their other unavoidable engagements. By reference to the report last year, it will be found to contain most of those drugs for which standards can easily be affixed; hence the duty of this Committee involves at once a series of nice investigations of drugs of fair quality, by which a certain and invariable method can be given to judge them and decide their real value. Any standards short of this will be mere show of words, and tend to mislead those for whose direction they are prepared. The Committee furthermore felt discouraged from prosecuting the work by the disregard that is paid to proper qualification in the appointment of officers to carry out the requirements of the drug law. So glaring has this disregard on the part of the Secretary of the Treasury become, that designing Druggists at one port, where a strict scrutiny is administered, have their importations of doubtful nature sent to another port where a less scrupulous examiner officiates, so that they may be passed. This, the Committee *know* to be true, and while it continues, no amount of accurate standards of quality will benefit the drug market and screen out the adulterated and deteriorated articles. The Committee would earnestly suggest to the Association that some decided step should be taken to remedy this evil by placing some check on the appointing power, so that it shall not be able to displace qualified officers by incompetent persons, at every phase of the political kaleidoscope.

If the Association, the several Colleges of Pharmacy, and the National Medical Association would join in a united effort, some impression might be made on Congress with a view to remedying the evil.

Besides the practical difficulties of preparing or ascertaining a set of standards, other questions arise that need the wisest judgment to determine them. Where a drug naturally and legitimately varies in strength, as cinchona, opium, &c., what shall determine its officially recognized standard strength? In the gum-resins, fixed oils, extracts, &c., the widest differences occur. Shall the mere fact that they are unadulterated pass them, or can a standard, practical in its character, be applied to them? Several of the volatile oils are almost invariably adulterated, as oil of roses, oil of origanum, &c. Shall these be rejected or admitted? To us it seems that a list of standards is chiefly useful in case of appeal, as a line which the examiner can draw, and beyond which he should not retreat. It is absurd to expect the examiner to test by chemical means all drugs that come before him; only those he suspects will be thus treated, and when that officer has the education and experience that is appropriate to his calling, we should have every confidence in the results.

William Procter,
Geo. D. Coggeshall, } *Committee.*
Edw. S. Wayne,

Proceedings of the American Pharm. Association.

REPORT OF A COMMITTEE TO CONSIDER AND REPORT ON THE SUBJECT OF HOME ADULTERATIONS. (AMERICA).

The subject of home adulterations of drugs naturally attracted the attention of the community, and especially of Pharmaciens and Physicians, in connexion with that of the foreign, to which we have applied so stringent a law.

No doubt the sophistication of drugs is as well understood in this country as on the other side of the Atlantic, and that if we could apply a remedy as general in its application, we should detect an amount equally astonishing. This is one of the arguments used by the opponents of the drug law, that medicines can be as readily adulterated here as abroad; but we contend that this is no argument against shutting out foreign adulteration, and we hope some of these days to put a stop to the evil at home. The precise method of doing this is not yet apparent, neither is it within the scope of the duties of this Committee to suggest a remedy. One of the results of the different reports from time to time upon this subject, will be to call the attention of the community to the subject, and create a public sentiment that shall demand purer and better medicines when needed, thus drawing the necessary discrimination between the qualities of them when offered either in packages or at retail.

The Committee do not design at present a full report, as there are still under their observation and that of others who have aided them in this matter, such articles as are usually met with. Some are of more, some of less importance, all, however, sufficiently so, we think, to merit attention and remark. They are mostly articles that have been found on sale in the interior towns and cities, purchased at the cities east, where most of the wholesaling is done. A few instances may be noticed:—

Balsam Peru has been met with, possessing none of the characteristics of genuine balsam, except in colour and consistency, and upon analysis affording no cinnamic acid.

Pulv. Capsici.—The sample examined had a brickdust colour, little pungency, and filled with yellow specks, and strong odour of *turmeric.* It was a mixture of turmeric and American capsicum, and, of course, almost inert.

Castor is found with the follicles filled with sawdust to half the weight of the castor.

Opium.—Since the circular of the Secretary of the Treasury, fixing a percentage of morphia for this drug, a more uniform quality has been found in market; but a great many samples have been observed the past season with foreign substances, most commonly lead, inserted in the lumps, in some instances equal to twenty per cent. of the weight of the mass. We are of the opinion that this was done abroad, and probably at the port whence shipped. The different examiners should seek to detect this fraud before passing it.

Musk in pod has been observed loaded in the same way, to the amount of twenty grains in a single pod.

The Essential Oils are largely adulterated in this country.

Oil of Peppermint sometimes contains fifty per cent. of alcohol. *Oil of Rosemary* is adulterated largely with turpentine, and, in short, the whole class are shamefully sophisticated.

Otto of Rose in the same class.

Cream of Tartar, adulterated with carbonate of lime, some samples to the extent of thirty-three per cent., others in less proportion. Sulphate of potash is also used for this purpose, and alum largely. Of six specimens examined by a gentleman of New York City, purchased at various shops, but *one* was found pure, some of them being adulterated thirty per cent. The same gentleman says, in reply to our inquiries, that from twenty-two specimens or samples of essential oils, fourteen were found to contain turpentine and other impurities. The same gentleman reports samples of powdered opium adulterated fifty per cent.

Cod Liver Oil.—All kinds of fish oil may be found neatly bottled and carefully labelled as the genuine article.

Sulphate of Quinine.—Samples have been detected with the old adulteration of mannite, and one gentleman reports quinine mixed up with fine picked raw cotton, adding to the bulk so as to fill the vial without using the requisite quantity of this valuable chemical.

Ipecacuanha in powder and Jalap in powder, each mixed with spurious matter, and English rhubarb in powder, put up for fine powdered Turkey, are not uncommon in all the markets.

Of crude materials, *Nitre*, or Saltpetre, is one of the most commonly sophisticated, being adulterated with common salt and nitrate of soda largely.

These are some of the reports made to us, all from reliable sources.

The Committee have endeavoured to establish points of observation in different sections of the United States, and as far as possible to obtain the names of houses from whom these various sophistications have been obtained. Such information they deem it best to withhold from publication at present, lest they might do injustice to parties ignorantly sending out such drugs; but they also intend from time to time to compare notes, and when satisfied of continued practices of this kind, will report such names to the Association.

In the mean time, they cannot too strongly urge retail Apothecaries especially to be cautious of whom and what quality of medicines they purchase. It is to the dispensing Apothecary that medical men and the community look for such medicines as are pure, not only "good of their kind," but of the best kind.

C. B. GUTHRIE,
GEO. D. COGGESHALL,
E. S. WAYNE,
A. J. MATTHEWS.

—*Proceedings of the American Pharmaceutical Association.*

LONDON VEGETATION *v.* LONDON SMOKE.

TO THE EDITOR OF THE TIMES.

SIR,—I have been gardener to the Hon. Society of the Inner Temple twenty-three years. When I first entered their service the Temple Gardens were very celebrated for white and red roses, and I was surprised in the city of London at the rose blooming at all, being a plant more sensitive to smoke than any other of the vegetable kingdom; still the old Provence, cabbage, and maiden-blush bloomed here beautifully.

There were then only two steamboats on the river Thames, that went to Richmond; but, as time rolled on, by degrees Old Father Thames became crowded with them every three or four minutes, and as they passed the gardens they vomited out their clouds of smoke on to my poor roses to such an extent that at last they ceased to bloom, and gradually began to decay. To add to this nuisance, a forest of high chimneys sprang up on the south side of the river; these, if possible, were worse than the steamboats, enveloping the garden in smoke night and day; all sorts of vegetation began to dwindle except chrysanthemums. Some fine old lime-trees used to grow and bloom beautifully; they ceased to bloom, and almost to throw out a leaf; but, thanks to our legislators, they passed an act to make these abominable nuisances discontinue. Such has been the result of this, that, I am happy to inform you, this year my poor roses, that have been in the gardens so many years, are now fast recovering their health, and show that they will not cease to blow, for I have a great many white ones coming, and red also, and the plant bids well for healthy wood for another year. The poor forest trees also are making shoots much better, although the spring has been so unfavourable to vegetation; in fact, everything in the garden is greatly improving in health and vigour. My stocks have not been so fine for years past. I don't want you to take my word on it; come and see, and judge for yourself. I challenge contradiction to this statement, and this is all through suppressing the smoke nuisance.

But there is one thing I must beg to call your attention to. I was up this morning a little after three o'clock at work, and I noticed several of the factories opposite take advantage in the night, and up till six this morning they sent out a great quantity of smoke. If they continue to do so much longer I will be up and watch them and find out their names, and send them to you to expose them. Perhaps the proprietors are not aware of it; if not, serve the men as Mr. Green does at the Whitefriars Glassworks: if his men make more smoke than they can possibly help, he fines them heavily for it; they won't do it a second time after that.

There is another and far greater circumstance connected with these gardens than the vegetable world. The benchers and members very liberally, at a great sacrifice of comfort and expense, allow about 200 families orders to walk in the gardens the whole year through. They also throw them open to the public after six o'clock in the evening, and on Sundays; on fine evenings, we average from 10,000 to 11,000 that pass in the course of the evening. The majority of these are poor little sickly-looking creatures, penned up in the close lanes and alleys round the neighbourhood, not old enough to get to the parks (as they would be tired in going there). I will tell you what they put me in mind of when they get on the lawn—a little dog that has been tied up all day, and let loose. They roll and tumble about, kicking up their little legs on the grass. It really does my heart good to see them; and I must confess that, out of such a number of little creatures, and no one to look after them except the officers of the gardens, I rarely have a flower plucked or a branch injured.

Picture to yourself, sir, these poor little children walking and rolling in clouds of smoke for three hours ; what good can such an atmosphere do them, inflating their little lungs with beastly smoke, such as it was here two years back ? When they came out they looked pale and tired ; now they go out with their little eyes sparkling with joy, running and jumping like so many kittens, refreshed from the change of air, and pleased with the treat. And all this is caused by suppressing the smoke nuisance.

I am, Sir, your obedient servant,
S. Broome,
Gardener to the Hon. Society of the Inner Temple.

APPOINTMENT OF PHARMACEUTIST TO THE BRISTOL ROYAL INFIRMARY.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The Trustees of the Bristol Royal Infirmary have recently adopted certain Resolutions, a notice of which may be interesting to those who have the management of other hospitals. I therefore beg to enclose copies of such Resolutions, and to state, that in accordance with the new rules, our Committee have elected a Pharmaceutical Chemist of the neighbourhood to the office of "Honorary Pharmaceutist to the Bristol Royal Infirmary." I am, Sir, your obedient Servant,

Bristol Royal Infirmary, July 14th, 1856. William Trenerry, *Secretary.*

Resolved,—"That the interests of this Charity have been proved to require the assistance of a professional Pharmaceutist, and that it is desirable the office of 'Honorary Pharmaceutist to the Bristol Royal Infirmary' be created, and that the Pharmaceutists of this city be invited to a position of honour on the staff of this establishment.

"That power be vested in the Committee to appoint an Honorary Pharmaceutist to this Infirmary, who shall purchase and be responsible for the selection, quality, and price of all the drugs and chemicals required in the Institution, such appointment to be continued during the pleasure of the Committee."

ALLEGED POISONING BY ANTIMONY.

A case has attracted much attention at Bolton, in which a flour dealer named Daniel M'Mullen is reported to have died from taking tartarized antimony, administered by his wife. The drug was known at the chemists' by the name of "quietners," and was usually purchased by women who had drunken husbands, to cure them of the habit.

At an inquest on the deceased, held by Mr. Taylor, the coronerof Bolton,

Mary Ann Hatton, a domestic servant, in the employ of the deceased and his wife for the last nine months, deposed as follows :—Deceased had had three drinking "bouts," each lasting three or four days. His last drinking bout began on the 7th of June, but he got well and attended to his business until the 21st of June, when he became ill, and Mr. Dorrian, surgeon, was called in next day. The prisoner (Betsy M'Mullen) was in the habit of drinking, as well as her deceased husband, seldom going to bed sober. Deceased had occasionally vomited his meals all the time she was there, but much oftener than usual during the last three months. He was sometimes sick when he had not been drinking. About three months ago she saw her mistress take a basin off the shelf in the pantry, and then a white paper out of her pocket, from which she took a pinch of white powder, and put it in the basin. She then put broth in the basin, and gave it to deceased. Did not remember whether he was ill after that. Since that time her mistress had often sent her out of the kitchen when she was preparing dinner. She had seen her mistress put some white powder into the deceased's food two or three times since then, and on Thursday, June 26, she saw her mix some with water, and put it into the physic bottle of the deceased, which Mr. Dorrian had sent him. The deceased took all the physic, and it made him very sick. On Friday last she put some white powder in some tea, and sent witness with it to deceased. Witness gave him part of it, and put the rest into a bottle and sent it to Mr. Dorrian, the surgeon. When her mistress was drunk on one occasion, witness took from her pocket a paper of white powder, which she sent to Mr. Dorrian.

Mr. James Dorrian, surgeon, said, on examination he found both the white powder sent to him and the tea to contain tartarized antimony. He was the medical attendant of the deceased, and never prescribed antimony. Had made a *post mortem* examination of the body, and found no appearance of natural disease to account for death ; but the appearances were similar to those which would be caused by the excessive and improper use of tartarized antimony, which, if it had not been the immediate cause of death, had accelerated it.

Mr. H. H. Watson, analytical chemist, said he had examined the bottles containing medicine and tea, and also the liver and kidneys of deceased, and found traces of antimony in all of them.

J. Rowland Simpson, druggist, said he was in the habit of selling emetic powders, composed of tartarized antimony and cream of tartar. The powders were sold at one penny each, and he usually cautioned the purchaser to be careful of it, and to divide each powder into four doses. They were called "quietners." He did not remember that men ever purchased them, but they were scarcely ever asked for, excepting by women whose husbands had been on the "spree," and are given to cause sickness and to throw up the dregs of drink. The probable extent of the sale is three or four powders per week.

It was proved that the deceased and prisoner had effected an insurance on their joint lives for £100, payable on the death of either to the survivor.

The jury found that the death of deceased had been accelerated by antimony, wilfully administered by Betsy M'Mullen, his wife, and expressed their disapprobation of the indiscriminate dispensing of such medicines.

The prisoner was then committed for trial at the assizes.

[Mr. Warburton, Chemist, Bolton, has written a letter to the Editor of the *Manchester Guardian*, repudiating the statement "that it has been the custom of the Bolton Druggists to supply dangerous medicines to any one who may apply, without any written or printed directions for use;" and stating that the majority of such cases of carelessness will be found to arise from persons who have not served a regular apprenticeship to the trade, and ought not to be classed as Chemists and Druggists.]

COURT OF QUEEN'S BENCH, GUILDHALL.

Before Lord Campbell.

CRANE *v.* VOULES.

Mr. M. Chambers, Q.C., Mr. Petersdorff, and Mr. J. Clerk appeared for the plaintiff; and Mr. Edwin James, Q.C., Mr. Serjeant Ballantine, Mr. Hawkins, Mr. H. James, and Mr. Doyle, for the defendant.

The plaintiff in this action, Dr. Crane, was a general practitioner, living in lodgings at 46, Stanley Street, Pimlico, and he sued the defendant, H. E. Voules, a solicitor, living in Alfred Place, Alexander Square, Brompton, to recover the sum of £143, being the balance of the plaintiff's account for medical attendance upon the defendant, his son, and a friend residing in his house. It appeared from Dr. Crane's evidence, that he was in practice as an Apothecary before the year 1815, but he had since become a member of the Royal College of Surgeons, and a graduate of the University of Aberdeen. In the month of September last he was introduced to the defendant by a Mr. Watts, a Chemist, in Brompton ; and from the 29th of that month he became the defendant's regular medical attendant down to the 18th of January, 1856. He also attended the defendant's son, and a gentleman named Fry, who lived in the house, making in all 116 visits. He wrote prescriptions, which he delivered to Mr. Watts, and Mr. Watts made up and supplied the medicine. The plaintiff charged at the rate of 10*s.* a visit, which he stated was the rate of remuneration agreed upon between him and the defendant; and his evidence on that point was confirmed by that of Mr. Watts, the Chemist. A letter was also read from the plaintiff to the defendant, written on the 12th of January, 1856, in which he proposed in future to charge at the rate of one guinea for three visits in lieu of one guinea for two visits, and to this letter the defendant replied, saying that he should accept the plaintiff's consideration for the future, but without making any observation as to the terms on which the plaintiff had attended him up to that time. The plaintiff was cross-examined at some length to show that his medicine had not produced any benefit to his patients, and that he was in the habit of taking small sums in respect of medicines sold by Watts to patients for whom he (the plaintiff) had prescribed.

Mr. James called the defendant, who distinctly denied the evidence given by the plaintiff. He said Watts had introduced the plaintiff as a man who was very badly off, and who would be willing to attend him on his own terms. He accordingly engaged his services, and paid him from time to time, giving him £1 for four visits, with which the plaintiff had always expressed himself quite satisfied. In fact, the plaintiff had always expressed himself very grateful to the defendant for his kindness, and had partaken of his hospitality, and so often that he nearly lived in the defendant's house; a state of things which the plaintiff in his evidence to-day had entirely ignored. At length, however, finding he did not get better, he wished to get rid of his doctor, and proposed that he should in future call upon him at his (the plaintiff's) residence. The plaintiff then wrote the letter of the 12th of January, and the defendant wrote the reply, acceding to the terms proposed. He explained his letter by saying that, as it was a part of the proposal that the plaintiff was only to call when sent for, he had made up his mind not to send for him again, and therefore he had no difficulty in acceding to the proposed terms. The defendant had not retained the plaintiff to attend his son; and as to Mr. Fry, he had promised to give him £20 if he could so far cure him as to enable him (a cripple) to walk up and down the street, but that result had not happened. Mr. Fry was called, and proved that the plaintiff did him no good; and the defendant's son said he had promised to give the plaintiff £50 if he could cure him, but that he had failed to do so. Evidence was also given to show that 3*s.* 6*d.* and 5*s.* were the usual charges made by general practitioners, sometimes including medicine, which in this instance was separately paid for to Mr. Watts.

Mr. Chambers, in his reply, strongly relied on the correspondence which had taken place between the parties, as amounting to an admission by the defendant that he was to pay at the rate of one guinea for two visits.

Lord Campbell, in summing up the evidence, said, he thought the letters read were conclusive as to the liability of the defendant to pay at the rate of one guinea for the two visits; but as to the charges for attending the son and Fry, his Lordship thought the defendant was not liable, for it was distinctly proved that in this case the plaintiff was not to be paid unless he cured the patients.

The jury adopted this view of the case, and found their verdict for the plaintiff for £28.—*Times, July* 1*st.*

ROYAL INSTITUTION OF GREAT BRITAIN.

Friday, June 13, 1856.

ON M. PETITJEAN'S PROCESS FOR SILVERING GLASS: SOME OBSERVATIONS ON DIVIDED GOLD.

BY PROF. FARADAY, D.C.L., F.R.S.

M. Petitjean's process consists essentially in the preparation of a solution containing oxide of silver, ammonia, nitric, and tartaric acids, able to deposit metallic silver either at common or somewhat elevated temperatures; and in the right application of this solution to glass, either in the form of plates or vessels. 1540 grains of nitrate of silver being treated with 955 grains of strong solution of ammonia, and afterwards with 7700 grains of water, yields a solution, to which, when clear, 170 grains of tartaric acid, dissolved in 680 grains of water, is to be added, and then 152 cubic inches more of water, with good agitation. When the liquid has settled, the clear part is to be poured off; 152 cubic inches of water to be added to the remaining solid matter, that as much may be dissolved as possible; and the clear fluids to be put together and increased by the further addition of 61 cubic inches of water. This is the silvering solution No. 1; a second fluid, No. 2, is to be prepared in like manner, with this difference, that the tartaric acid is to be doubled in quantity. The apparatus employed for the silvering of glass plate consists of a cast-iron table box, containing water within, and a set of gas-burners beneath to heat it: the upper surface of the table is planed and set truly horizontal by a level, and covered by a varnished cloth: heat is applied until the temperature is 140° Fah. The glass is well cleaned, first with a cloth; after which a plug of cotton, dipped in the silvering fluid and a little polishing powder, is carefully passed over the surface to be silvered, and when this application is dry it is removed by another plug of cotton, and the plate obtained perfectly clean. The glass is then laid on the table, a portion of the silvering fluid poured on to the surface, and this spread carefully over every part by a cylinder of india-rubber stretched upon wood which has previously been cleaned and wetted with the solution; in this manner a perfect wetting of the surface is obtained, and all air bubbles, &c., are removed. Then more fluid is poured on to the glass until it is covered with a layer about the $\frac{1}{10}$th of an inch in depth, which easily stands upon it, and in that state its temperature is allowed to rise. In about ten minutes or more silver begins to deposit on the glass, and in fifteen or twenty minutes a uniform opaque coat, having a greyish tint on the upper surface, is deposited. After a certain time the glass employed in the illustration was pushed to the edge of the table, was tilted that the fluid might be poured off, was washed with water, and then was examined. The under surface presented a perfectly brilliant metallic plate of high reflective power, as high as any that silver can attain to; and the coat of silver, though thin, was so strong as to sustain handling, and so firm as to bear polishing on the back to any degree, by rubbing with the hand and polishing powder. The usual course in practice, however, is, when the first stratum of fluid is exhausted, to remove it, and apply a layer of No. 2 solution; and when that has been removed and the glass washed and dried, to cover the back surface with a protective coat of black varnish. When the form of the glass varies, simple expedients are employed; and by their means either concave or convex, or corrugated surfaces are silvered, and bottles and vases are coated internally. It is easy to mend an injury in the silvering of a plate, and two or three cases of repair were performed on the table.

The proposed advantages of the process are,—the production of a perfect reflecting surface; the ability to repair; the mercantile economy of the process (the silver in a square yard of surface is worth 1*s.* 8*d.*); the certainty, simplicity, and quickness of the operation; and, above all, the dismissal of the use of mercury. In theory the principles of the process justify the expectations, and in practice nothing as yet has occurred which is counter to them.

With regard to the second part of the evening's discourse, the speaker said he had been led by certain considerations to seek experimentally for some effect on the rays of light, by bodies which when in small quantities had strong peculiar action upon it, and which also could be divided into plates and particles so thin and minute as to come far within the dimensions of an undulation of light, whilst they still retained more or less of the power they had in mass; and though he had as yet obtained but little new information, he considered it his duty, in some degree, to report progress to the Members of the Royal Institution. The vibrations of light are, for the violet ray 59,570 in an inch, and for the red ray 37,640 in an inch; it is the lateral portion of the vibration of the ether* which is by hypothesis supposed to affect the eye, but the relation of number remains the same. Now a leaf of gold as supplied by the mechanician is only $\frac{1}{280000}$ of an inch in thickness, so that 7½ of these leaves might be placed in the space occupied by a single undulation of the red ray, and 5 in the space occupied by a violet undulation. Gold of this thickness and in this state is transparent, transmitting green light, whilst yellow light is reflected; there is every reason to believe also that some is absorbed, as happens with all ordinary bodies. When gold leaf is laid upon a layer of water on glass, the water may easily be removed, and solutions be substituted for it; in this way a solution of chlorine, or of cyanide of potassium, may be employed to thin the film of gold; and as the latter dissolves the other metals present in the gold (silver, for instance, which chlorine leaves as a chloride), it gives a pure result; and by washing away the cyanide, and draining and drying the last remains of water, the film is left attached to the glass: it may be experimented with, though in a state of extreme tenuity. Examined either by the electric lamp, or the solar spectrum, or the microscope, this film was apparently continuous in many parts where its thickness could not be a tenth or twentieth part of the original gold leaf. In these parts gold appeared as a very transparent thing, reflecting yellow light and transmitting green and other rays; it was so thin that it probably did not occupy more than a hundredth part of a vibration of light, and yet there was no peculiar effect produced. The rays of the spectrum were in succession sent through it; a part of all of them was either stopped or turned back, but that which passed through was *unchanged* in its character, whether the gold plate was under ordinary circumstances, or in a very intense magnetic field of force.

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* Analogous transverse vibration may easily be obtained on the surface of water or other fluids by the process described in the *Philosophical Transactions* for 1881, p. 336, &c.

When a solution of gold is placed in an atmosphere containing phosphorus vapour the gold is reduced, forming films that may be washed and placed on glass without destroying their state or condition: these vary from extreme thinness to the thickness of gold leaf or more, and have various degrees of reflective and transmissive power; they are of great variety of colour, from grey to green, but they are like the gold leaves in that they do not change the rays of light.

When gold wires are deflagrated by the Leyden discharge upon glass plates, extreme division into particles is effected, and deposits are produced, appearing, by transmitted light, of many varieties of colour, amongst which are ruby, violet, purple, green, and grey tints. By heat many of these are changed so as to transmit chiefly ruby tints, retaining always the reflective character of gold. None of them affect any particular ray selected from the solar spectrum, so as to change its character, otherwise than by reflection and absorption; what is transmitted still remains the same ray. When gold leaf is heated on glass, the heat causes its retraction and running together. To common observation the gold leaf disappears, and but little light is then reflected or stopped; but if pressure by a polished agate convex surface be applied to the gold in such places, reflective power reappears to a greater or smaller degree, and green light is again transmitted. When the gold films by phosphorus have been properly heated, pressure has the same effect with them.

If a piece of clean phosphorus be placed *beneath* a weak gold solution, and especially if the phosphorus be a clear thick film, obtained by the evaporation of a solution of that substance in sulphide of carbon, in the course of a few hours the solution becomes coloured of a ruby tint; and the effect goes on increasing, sometimes for two or three days. At times the liquid appears clear, at other times turbid. As far as Mr. Faraday has proceeded, he believes this fluid to be a mixture of a colourless transparent liquid, with fine particles of gold. By transmitted light, it is of a fine ruby tint; by reflected light it has more or less of a brown yellow colour. That it is merely a diffusion of fine particles is shown by two results: the first is, that the fluid being left long enough the particles settle to the bottom; the second is, that whilst it is coloured or turbid, if a cone of the sun's rays (or that from a lamp or candle in a dark room) be thrown across the fluid by a lens, the particles are illuminated, reflect yellow light, and become visible, not as independent particles, but as a cloud. Sometimes a liquid which has deposited much of its gold, remains of a faint ruby tint, and, to the ordinary observation, transparent; but, when illuminated by a cone of rays, the suspended particles show their presence by the opalescence, which is the result of their united action. The settling particles, if in a flask, appear at the bottom, like a lens of deep-coloured fluid, opaque at the middle, but deep ruby at the edges; when agitated they may be again diffused through the liquid. These particles tend to aggregate into larger particles, and produce other effects of colour. It is found that boiling gives a certain degree of permanence to the ruby state. Many saline and other substances affect this ruby fluid: thus, a few drops of solution of common salt being added, the whole gradually becomes of a violet colour; still the particles are only in suspension, and, when illuminated by a lens, are a golden yellow by reflected light: they separate now much more rapidly and perfectly by deposition from the fluid than before. Some specimens, however, of the fluid, of a weak purple or violet colour, remain for months without any appearance of settling, so that the particles must be exceedingly divided; still the rays of the sun, or even of a candle in a dark room, when collected by a lens, will manifest their presence. The highest powers of the microscope have not as yet rendered visible either the ruby or the violet particles in any of these fluids.

Glass is occasionally coloured of a ruby tint by gold; such glass, when examined by a ray of light and a lens, gives the opalescent effect described above, which indicates the existences of separate particles—at least, such has been the case with all the specimens Mr. Faraday has examined. It becomes a question whether the constitutions of the glass and the ruby fluids described is not, as regards colour, alike. At present, he believes they are; but whether the gold is in the state of pure metal, or of a compound, he has yet to decide. It would be a point of considerable optical importance if they should prove to be metallic gold; from the effects presented when gold wires are deflagrated by the Leyden discharge over glass, quartz, mica, and vellum, and the deposits subjected to heat, pressure, &c., he inclines to believe that they are pure metal.

DONATION TO THE MUSEUM OF THE PHARMACEUTICAL SOCIETY.

Mr. William Procter, jun., of Philadelphia, one of our Honorary Members, has sent a valuable and interesting collection of indigenous plants and medicinal substances, as a donation to the Museum of the Society. The specimens have not yet been received, but are announced at Liverpool. Further particulars will be published when they have been examined and deposited in the Museum.

TO CORRESPONDENTS.

Mr. James (Bognor) states, in reference to Mr. Stoddart's process for making blue pill (vol. xv., p. 322), that in following the directions, by adding "a small quantity of water to the mercury and liquorice powder," after trituration for two hours, the mercury was still in an undivided state; but by the addition of sufficient water to make the liquorice powder into a rather stiff paste, it succeeded perfectly, and the mercury was "killed" with surprising rapidity.

M. (Manchester) (1.) should apply, by letter, to the Secretary, 17, Bloomsbury Sq. (2.) There is no law to prevent any person using the title of "Chemist and Druggist."

E. S. A. (Tonbridge).—The newspaper containing the advertisements referred to has been received. The person is not a member of the Pharmaceutical Society.

S. W. E. (Lambeth).—Skeletons of leaves are obtained by maceration in water; and, when sufficiently decomposed, are cleansed by means of a syringe.

W. Cornish (Brighton), *E. W.* (Lynn).—It is in a forward state; but there is more work in it than was at first anticipated.

T. H. S. (Truro).—The law admits of no evasion by the mixture of spirit of wine with syrups, when used as cordials, for the purpose of saving duty.

H. W. W. (Birkenhead), *Excelsior* (London).—Apply, by letter, to the Secretary, 17, Bloomsbury Square.

Botanica (Maidstone).—In competing for the Botanical Prize the plants should be arranged according to the conditions published in the April number of this Journal, p. 448.

T. D. W. (Liverpool).—All stills above the capacity of two gallons are subject to the duty of ten shillings per annum. *T. D. W.* should write to the Board of Inland Revenue, Somerset House.

B. C. B. V.—(1.) Methylated spirit is applicable in the preparation of strychnine. (2.) The subject is under consideration.

A Member (Clerkenwell).—The specimens are appreciated.

W. G. K. (Market Drayton.)—(1.) Hardwich's *Photographic Chemistry.* (2.) When cod liver oil is described as colourless and tasteless, the terms are used comparatively.

We have received from Mr. Wood, Brighton, a pamphlet describing the "*Anæsthesimeter*," a new apparatus for the administration of chloroform.

ERRATA.

In the July number, page 15, line 30, *for* three pounds to one of flowers, *read* one pound to three of flowers. Page 17, line 10, *for* described, *read* undescribed. Page 24, line 6 from top, *for* 1.500, *read* 1.850. Page 26, at the end of the paper, *for* toxologist, *read* toxicologist. Vol. xv., page 532, line 21, *for* Pilot, *read* Pilate. For the errata in the List of Members see the cover.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd) to Mr. Churchill, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XVI.—No. III.—SEPTEMBER 1st, 1856.

THE ADULTERATION OF FOOD, DRUGS, &c.—RESULT OF THE PARLIAMENTARY INQUIRY.

When any flagrant abuses are brought prominently under the notice of the public, there is no lack of suggestions for their removal. To amateurs and superficial observers this may appear to be attended with little difficulty, for what can be more easy than the application of the antidote when the presence of a poison is proved and its nature understood?—for example, the prevalence of fraud and adulteration having been demonstrated, and numerous illustrations published, what difficulty can there be in framing an Act of Parliament prohibiting such practices, and inflicting penalties on all offenders?

Practical men—those who have had personal experience in the several branches of business in which the frauds in question prevail, are less sanguine as to the result of the proposed legislation. This may arise in part from the fact, that habit reconciles the mind to the conventionalities of each trade or business, and thus abuses may pass unobserved, which, to a fresh eye, appear intolerable; but it must also be remembered that only those who are behind the scenes are practically acquainted with the working of the machinery and the obstacles to be overcome.

The public may be classified under two heads or opposing elements, namely, buyers and sellers, who are engaged in playing the game of "diamond cut diamond" with each other. The buyer delights in getting anything that is cheap, but when he finds that he has been imposed upon, he naturally feels indignant, complains of the defective state of the law, and suggests a severe and effective Act of Parliament for the protection of himself and the public at large from such annoyance. But, although a buyer in this instance, he is in his own particular business a seller; and while he desires to deal honestly, and has no wish to shrink from any restrictions which may seem fair and desirable for the general suppression of fraud, he finds that the law which he has framed for his neighbour would recoil most injuriously on himself; that however innocent he might be, he would be liable, under such a law, to punishment for the offences of others; that the restrictions would interfere with some portion of his legitimate trade in a manner not contemplated by himself or desirable for the interests of the public.

In this struggle between buyer and seller, the perplexity of which is brought home to the amphibious portion of the community—that is to say, those who are in both capacities—the appeal was made to the Legislature, resulting in the appointment of a Committee of the House of Commons, to investigate the subject in all its bearings. The most active promoters of this movement were persons not in trade, and consequently not acquainted with all the practical difficulties attending the undertaking. But the progress of the investigation has been watched with much interest and sincere hopes for its success by the respectable portion of the commercial community in general. The conflicting nature of the evidence, and the various remedies proposed, have appeared in the abstracts which we have given from time to time; and the final report of the Committee is published entire in another part of this number.

By the most enthusiastic promoters of the crusade, the report is not considered sufficiently definite and conclusive. The propositions which it contains are not of that sweeping character which was desired, and the two sides of the question are placed in juxtaposition, in such a manner as to show that it is not so easy to put an extinguisher on the evils complained of, as some persons seem to imagine.

It is obvious from the tenor of the questions and the ramifications of the inquiry during its progress, that the Committee were not prepared in the first instance for so formidable a task as they found it to be, and that the information elicited modified considerably the preconceived notions originally entertained. We consider this to be a favourable feature in the Report, as it denotes impartiality, and a disposition to rely rather on facts than on theories. The Committee very properly recognize the distinction between fraudulent adulteration or substitution, and the conventional mixture of substances for some avowed object, with the knowledge and consent of the purchaser. The sale of articles of inferior quality at a proportionate price, is shown to be unavoidable and distinct from culpable sophistication, and the importation of inferior or partially damaged drugs is also sanctioned, for reasons which are clearly stated in the Report. These points being conceded, the question is reduced into a narrow compass. The theoretical aspirations for ABSOLUTE PURITY are thrown aside, and the objects contemplated in the proposed legislation may be briefly stated to be the exposure of adulteration by the aid of science and improved education, the summary punishment of persons convicted of fraud, the supervision of these matters by certain public bodies invested with the requisite powers, and the introduction of such precautionary regulations as may be found practicable with regard to the sale of poisons. The Committee also recommend the repeal of the law imposing a duty on patent medicines, which has for many years disgraced the statute-book, by giving the Government a share in the ill-gotten gains of quacks and impostors, and thus lending the shadow of a cloak to imposition.

A subject which appears to have occasioned much discussion and no little perplexity, is the adulteration of bread, and "the Committee have given the provisions of the Bread Act in some detail, because it seems to them to comprise much that may be useful in framing a measure applicable to adulterations generally." There is one peculiarity in the working of this Act which is deserving of notice. The Act imposes the most severe and positive restrictions as to the use of alum; not only is the mixing of alum and other ingredients with flour or bread prohibited under a penalty of £20, but the premises of a baker are liable to inspection under search warrant, and even the possession of any forbidden ingredient is an offence punishable by fine or imprisonment. Yet in spite of this iron grasp of the law, which *in theory* seems to leave the culprit no means of escape, it was proved before the Committee that the custom of mixing alum with bread is almost universal. If, therefore, the Bread Law is to be taken as a specimen of legislation, and a general Act of Parliament were to be framed after that model, and *with the same result*, the word GENUINE would soon be expunged from the English dictionary. The difference of opinion among the scientific witnesses as to the effect of alum on the health, and the state in which it exists in bread, shows the necessity for a further investigation of the subject. We quite agree with the Committee in the opinion that the experience derived from the Bread Act will be useful—not, however, as a model for imitation, but as the type of a species of legislation "more honoured in the breach than in the observance."

In tracing the cause of failure in this instance, we are led to consider the general principles which should be observed in framing such a law. There is no mistake greater than that of supposing that an Act of Parliament will be operative in proportion to its severity, the complication of its machinery, and the excessive amount of the penalties. A moderate penalty, with facility of detection, and an inexpensive mode of summary conviction, will be found more efficacious than the most terrible punishment, hedged about with the expense and circumlocution of a court of law, and the odium of "breaking a fly upon the wheel." A baker is liable to a penalty of £10, or six months' imprisonment,

ing in his possession a crystal of alum. The law jumps to the conclusion
has it for an unlawful purpose. But how is a conviction to be obtained?
rch warrant, which a magistrate has the power to grant, upon grounds of
on being shown. And by what means is such *primâ facie* evidence
able? By the aid of spies in his service, living upon his pay, and bribed
ay him. Supposing the spy to be found, where is the prosecutor?
ersons would incur the expense and odium of hunting down a baker,
g him to prison, and his family to the workhouse, because he had a
of alum on his premises. Yet such is the state of the law, that if it were
arried into effect, almost every baker in the kingdom would be in gaol.
ding against a baker for selling adulterated bread, would not have the
emblance of persecution; but the fees to counsel and chemical witnesses,
ther expenses of the suit, would amount to more than the gratification of
ing a baker would be worth. Any person who could afford to take such
dings would prefer changing his baker, and the poor have no redress.

n this view of the question, it will be seen that the objects to be desired
proposed new law, are moderate penalties, a summary conviction, and a
prosecutor, assisted by a staff of chemical inspectors, and acting under
thority of a public Board or Boards, as suggested in the report of the
nittee. Every precaution should be taken to confine the operation of the
parties who are the real offenders, and not to involve in disgrace and
hment those who may be in fact the dupes and victims of others. Evi-
of a guilty knowledge, either positive or inferential, should be required in
case before conviction. This may sometimes be attended with consider-
lifficulty, but the laws are made for the protection of the innocent, and it
etter that rogues should sometimes escape, if their punishment could only
fected by including the guilty and the innocent in the same category.
dering the number of hands through which commodities, whether British
eign, pass, during their progress from the original producer to the con-
, the several purposes for which they are required, the variations in
y and mode of preparation suitable for different purposes, and the natural
nce of competition on the quality as well as the quantity of the articles for
a demand exists, it must be obvious that no law which human ingenuity
invent would secure the public against the possibility of imposition, and
o a certain extent the responsibility must be shared between the buyer and
ller. Of this the Committee appear to be fully sensible, but the object of
recommendations appears to be to furnish to the honest portion of the
the best means of protection which the law is capable of affording against
rils of systematic fraud and culpable ignorance. If the measure proposed
d be found insufficient, it may be taken as a step in the right direction,
xperience will dictate the amendments required. Hasty legislation on a
ct attended with so much difficulty, would be improper and injudicious,
he attempt to introduce a very severe and sweeping measure would in all
ability defeat its own object, by extending the field of opposition, and
ving the question in greater intricacy. Every practical means should be
ted to facilitate the exposure and punishment of fraud wherever it is found
ist. Examples may be found in high places. The Government takes a vote
oney from the House of Commons for a specific object, and appropriates a
on of it (if there happen to be an overplus) to some other object for which
ouse of Commons would not knowingly have granted the vote. A grocer
ves a sum of money from a customer for a specific object (a pound of
e), and he appropriates a portion of it to chicory and other ingredients, for
h the customer would not knowingly have given the money. Unquestion-
the parties proved guilty of such practices ought to be punished.

A LICENCE IN PHARMACY.

It is worthy of remark, that persons often arrive at the same result by very different means. Early in the year 1841 the Pharmaceutical Society was inaugurated for the purpose of uniting into one body all the Chemists and Druggists of the Kingdom, for the advancement of Pharmacy and the introduction of such a uniform system of education as should ensure to the profession and the public the safest and most efficient administration of medicine. It formed a part of the original plan that, in future, all Chemists dispensing medicines should be licensed as in France, Germany, and other civilized nations, and that save and except those who had already entered the trade, no person should receive a licence in Pharmacy without previously passing an examination. To facilitate the accomplishment of the desired reformation, a course of education was prescribed, schools of Pharmacy established, and the lamp of knowledge was ignited both in London and in the leading provincial towns. Eminent professors were retained, a Board of Examiners appointed, a library and museum, lecture-room, and other requisites provided, and everything was done which could be effected under the voluntary system, to draw into the focus of education and proficiency the rising generation of Apprentices who were destined to shine in days to come as a superior race of Pharmaceutical Chemists. In a detailed outline of the Association, published in May, 1841, it was stated, "The organization of a judicious plan in the form of a private Society, will, if conducted with energy and perseverance, become the groundwork of that reform which the welfare of the public requires; the Medical Profession in general will derive advantage from the increased respectability and competence of those who prepare their prescriptions; and the support of Government in completing the success of the measure may reasonably be expected."

Some of the leading members of the medical profession, approving of the object contemplated, although not at first sanguine as to the result, gave the Society their sanction, and watched its progress with interest, occasionally attending the scientific meetings and contributing papers which were published in the Transactions.

The public paid no attention to these proceedings, the press vied with the public in quietness on the subject, a royal charter of incorporation was granted, but beyond this, neither the Secretary of State nor the House of Commons evinced any disposition to assist or interfere. Petitions were presented to Parliament and laid on the table, appeals were made to influential members, and politely acknowledged, and for a long time the movement was not recognized as one in which the public interest was in any way concerned. It was supposed to be a class question, tending towards a monopoly, and the enjoyment of exclusive privileges by the parties who were exerting themselves in the matter, and such innovations, as they are termed, are usually resisted, or at all events viewed with some degree of jealousy, as an interference with free trade.

When the Pharmacy Bill was introduced into Parliament, it was originally framed, on the principle above mentioned, as a general measure for the registration of all Chemists and Druggists, prohibiting any person not so registered from carrying on the business, and requiring all future Chemists to be examined prior to registration. This was, in effect, a licence in Pharmacy. But the House of Commons objected to so sweeping a measure, and in the Select Committee the Bill was considerably pared down. The Pharmaceutical Society was invested with some additional powers, certain honorary titles were conferred on its members, but no interference with free trade in drugs and poisons was permitted, provided always that unregistered persons availing themselves of this laxity, did not assume the names, titles, &c., conferred by the Act upon registered Pharmaceutists. Armed with the authority conferred by the Act, although not possessed of the extended powers originally sought, the Society has steadily progressed, and in each succeeding year has acquired additional weight and influence.

Recent disclosures respecting the adulteration of food and drugs have opened the eyes of the public; the incompetence of many of the persons who deal in dangerous substances has been discussed; several cases of poisoning have occurred, illustrating in a forcible manner the laxity of the law, and the sacrifice of life which results from free trade in poisons by uneducated persons.

We subjoin an extract from the first volume of this Journal, in juxtaposition with one from a leading article in the *Times* of last week:—

Pharmaceutical Journal, Nov., 1841.	*Times, Aug.* 25, 1856.
The Physician undergoes an expensive and laborious education—he devotes much time to pathological research—he carefully observes the effect of remedies, and calculates to a fraction the dose which his experience leads him to prescribe. He is perplexed with the uncertainty in the effect of his prescription, and may probably trace it to the variable quality of the drugs, but here his power terminates. Unless he will collect, prepare, and compound all the ingredients which he orders, or can ensure the co-operation of the dispenser, his efforts must inevitably prove abortive, and his credit is of necessity in danger, on account of circumstances not under his control.	It requires but a slight portion of common sense to understand how important an ingredient of medical success the purity of drugs must be. Drugs are the executive of the medical man, and therefore with bad or inefficient drugs he acts like a paralyzed man, whose limbs refuse to obey him. The Physician may have the most exact idea in his own head of the amount of drug power which he wants to apply to the patient's disease, but if his drug deceives him, and contains less of this virtue than it professes to do, and perhaps even that injured by some foreign admixture, his whole estimate is affected, and the process becomes a piece of guess-work.

It will be seen that the passages above quoted are in substance identical, although the remarks of our contemporary are more forcibly expressed.

The most eloquent appeal to the common sense and prudence of the public is contained in the evidence of the apprentice-boy, who, having sold to a woman a quarter of a pound of arsenic to kill fleas, stated before the coroner, "Mercury and arsenic are the same thing;" and in answer to the question how much arsenic will kill an adult, replied, "A teaspoonful." That boy is a benefactor to the human race. Brevity is the soul of wit, and this laconic display of artless simplicity is more eloquent than a volume of arguments founded on undisputed facts. There is nothing new or startling in this specimen of a dealer in poisons. For more than fifteen years we have been endeavouring to convince the public, the profession, and the Legislature, that there exists in the country a numerous class of persons of whom Peter Reddin is the type, but we have never succeeded in finding words so expressive and convincing as the simple statement of the boy himself, "Arsenic and mercury are the same thing"——"A teaspoonful of arsenic will kill an adult."

The suggestions offered for regulating the sale of poisons and checking the adulteration of drugs, bring us back to the original proposition—a licence in Pharmacy. We again quote from the *Times* of August 25th:—

> "For some system of licensing Chemists there is unanimous authority, and the sad details of the case at Bolton, which we publish elsewhere, furnish additional proof of the occasional ignorance of Chemists. A licence given upon adequate examination by a suitable Board would secure an improvement in the Chemist's professional knowledge, and this would give him a greater power of detecting adulteration in the drugs sent him for purchase. At present he is half deceiving and half deceived. With an Analytical Board appointed by Government to test imported drugs—another step which most of the evidence favours—the public would have a much improved security against this evil; while, at the same time, it is satisfactory to notice that, even previous to all legislative change, the work of reform had begun from within, in the improved character and public spirit of the chemical profession itself."

On this subject the Committee observe in their Report:

"The question of licences, however, may perhaps be properly deferred till it be seen how far the efforts of the Pharmaceutical Society and a more general system of inspection may prove successful."

We quite agree in the opinion that such a measure ought not to be hastily adopted, as the terms and conditions under which the licence should be granted require serious consideration; but we defer our remarks on this subject until a future occasion.

CRUEL EXPERIMENTS.

The name of Orfila will always be associated with the science of Toxicology. It was the business of his life to investigate the chemical and physiological action of poisons, to note the symptoms, the variations in the effect according to the dose or the circumstances under which it is administered, the antidotes, and the mode of treatment most efficacious in cases of poisoning. The facts elicited in the course of these researches are recorded for the benefit of mankind among the archives of Science.

Professor Christison and Dr. Taylor, in our own country, have devoted to that subject their especial attention, and their works are referred to in our courts of law and on the Continent among the highest authorities in Toxicology. Much of the information contained in such works is derived from the history of cases of accidental or criminal poisoning, the particulars of which have been minutely investigated and carefully recorded. But it not unfrequently happens in these cases that the evidence is incomplete, the description of the symptoms by non-professional witnesses is confused and contradictory, doubts exist as to the quantity of poison administered, the delicacy of the tests, the modification of the effects and appearances by the matters with which it comes in contact. To clear up these doubts experiments are necessary, and a certain amount of cruelty to animals is sometimes unavoidable, and those animals are usually selected which, in regard to physiology, constitution, and their food, most nearly resemble the human species. In connexion with this subject the name of Orfila was the first that occurred to us, because we believe that he carried this kind of research further than almost any other person, and displayed the greatest amount of ingenuity in the mode of conducting his experiments, and in the deductions at which he arrived. He sometimes performed experiments of this kind in the lecture-room, to illustrate the subjects under discussion, a practice for which the plea of necessity cannot be urged, as the facts having been already established, a repetition of the torture could serve no good purpose. In some of the experiments of Magendie, animals were literally cut to pieces alive, for the purpose of tracing the course of the nerves, and ascertaining various facts relating to the degree of sensation in different parts, and other functions of the animal economy. In reading the records of such operations, with the matter-of-fact comments on the behaviour of the victim whose spinal nerves are under investigation, or whose intestines are partially removed for the performance of some speculative operation, we are led to the belief that the habit of witnessing torture must blunt the feelings Enthusiasm for science, and the desire to trace out some important fact for the benefit of mankind, may in some instances overcome every other consideration; those who frequently carry on these researches become more or less callous, and in the excitement of the moment pay no regard to the feelings of the animal, as the Spanish ladies, from the force of habit, witness the sanguinary and mortal conflicts of the bullfight, not only without a shudder, but even with enthusiasm and delight. The sight of blood causes some persons to faint, and it not unfrequently happens that medical students, on witnessing the first surgical operation, are carried fainting out of the theatre, or obliged to hurry away to save themselves from this exposure. By practice, that is to say, by familiarity with the sight of suffering in varied forms, the nerves lose that acute sensibility which they originally possessed, and the eye can watch with comparatively little emotion, or probably with a professional interest, scenes which at a former time would have overpowered the faculties through the medium of the sympathies. There is also the reflection that the operations performed are for the relief and benefit of the sufferers, and that it is a part of the duty of a medical man to cheer and encourage his patients, and not to increase their alarm by the display of morbid sentiment. It is fortunate for suffering humanity that the mind is susceptible of this kind of training, that by experience and a strong effort of the will, the nerves become braced, and the brain capable of exercising its functions at the time of need. If it were otherwise, the surgeon would never be sure of retaining self-command, his hand would shake, and he would become bewildered at the most critical moment during an operation, when the life of the patient depended on his presence of mind. This wise provision of nature, which fortifies both mind and body for any exigencies that may arise, is liable to abuse. The power of witnessing acute sufferings without flinching may degenerate into a morbid indifference or habitual cruelty, and the object of these remarks is to discourage the tendency to needless experiments of this nature, which have been promoted by the discussions on recent cases of poisoning by strychnia. Such experiments by students or other inexperienced persons are quite unjustifiable.

The doubts which arose during Palmer's trial were founded chiefly on professional mystification between the advocates *pro* and *con.*, each striving to outvie the other in the subtleties of scientific hypothesis. No doubt existed as to the guilt of the prisoner, and the points which required to be cleared up had reference to the delicacy of the tests for strychnia, and the possibility of detecting it in different parts of the body, under circumstances likely to be applicable to future cases. Some researches for this purpose might be necessary, and the facts having been ascertained, no advantage can arise from a repetition of experiments the result of which is already known. Dr. Taylor, when asked at Palmer's trial, whether he had himself performed certain experiments, replied that he had not. The facts having been established by the researches of others, he objected to torturing animals by the useless repetition of such operations. Although Mr. Serjeant Shee twitted him with his humanity, apparently with a view of disparaging his authority as a toxicologist, this was obviously one of the "tricks of the trade," and Dr. Taylor lost no credit in his professional capacity, while he placed himself in a favourable light in other respects, by the straightforward avowal of his conscientious scruples against needless cruelty.

Although the lower animals are intended for the service of mankind, there are limits beyond which a disregard of their sufferings is a crime, and nothing but necessity, or the establishment of facts of great importance to the human race, can justify or extenuate the inflictions to which they are subjected in the cause of science. Some of the tortures occasionally perpetrated are too horrible to admit of description, but we may take a mild example by way of illustration. A dose of strychnia is given to a dog. As soon as it begins to operate, each symptom is watched—the time and period of duration noted, the twitchings, tetanic convulsions, the spasms, the appearance of distress, the intense agony and paralysis, the intervals of relief and the recurrence of the paroxysms. Hours pass away, the animal becomes weaker—again he rallies, and another attack ensues; he becomes fierce, being maddened with torment. The operator is weary, and retires to bed. He lays his head on his pillow and enjoys peaceful slumbers, while his victim, shut up in an outhouse too far off to disturb him, howls unheard and unpitied, until exhausted nature releases him from his misery. In the morning the man of science, having taken his breakfast, proceeds to the outhouse. He finds the dog dead, and records the fact in his note-book, with a dozen other cases of a similar description, the principal difference consisting in the number of hours (from one to twenty-four) during which the torture was protracted.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.
NORTH BRITISH BRANCH.

SUPPLEMENT TO THE LECTURE ON STRYCHNINE.

BY STEVENSON MACADAM, PH.D., F.R.S.E.;

Lecturer on Chemistry in the Medical School, Surgeons' Hall; to the School of Arts; and to the Pharmaceutical Society of Great Britain.

Since writing the notes of the Lecture on Strychnine which appeared in the August number of the *Pharmaceutical Journal*, I have been engaged in prosecuting still further the inquiry as to the possibility of detecting strychnine in ordinary and extraordinary circumstances. These later researches I now proceed to record.

The first instance I refer to was that of a Scotch terrier dog, which was poisoned by a minimum dose of strychnine. The animal was about eight years old, and though healthy, was not in the best condition. Only one-eighth of a grain of strychnine was administered to this dog, and I resolved that come what might—whether the animal died from this small dose, or survived its effects—the various organs of its body should be tested for strychnine. The following are the symptoms, &c., exhibited by

THE SCOTCH TERRIER DOG.

0 minute.	Received $\frac{1}{8}$ gr. of strychnine, along with a $\frac{1}{4}$ lb. beef steak.
2 hours	Sudden jerks, during which the head was thrown back; these jerks occurred every two or three minutes during one hour.
3 "	Tetanus set in. At first the spasms were lengthy and severe; but soon they became mere jerks—urine was ejected—violent and heavy breathings.
3 " 10 minutes.	Repose—a touch, at first gentle, but afterwards severe, failed to bring on the spasms—when motioned to, the dog rose, walked about, lapped up some water, and in every respect behaved itself as if no strychnine had been administered.
3 " 20 "	The fore legs became convulsed, whilst the hinder legs remained unaffected. In this condition the dog described a skating motion round the room.
3 " 23 "	Recovered the use of all its limbs and walked about.
3 " 30 "	Same as occurred at 3 h. 20 m.
3 " 45 "	Repose, with occasional jerks.
12 "	Death.

Though I have stated twelve hours to be the period at which the above dog succumbed to the influence of strychnine, yet such must only be considered the probable hour of death. After attentively watching the dog for four hours, I left my laboratory for the evening, and returned in ten hours thereafter, being fourteen hours from the commencement of the experiment, and, as the animal was still sensibly warm, I judged it likely that it must have died about two hours before my return—in other words, in twelve hours from the administration of the alkaloid.

The Scotch terrier dog was dissected in about six hours after its death, and on examination by the method detailed in my former paper, strychnine was detected in (1) the stomach and intestines, (2) the muscles, lungs, liver, spleen, kidneys, and heart, (3) the blood, and (4) the urine. The latter was found in the bladder after the death of the dog, so that it is likely it was all secreted after the spasms commenced, at which time, it will be remembered, the then secreted urine was forcibly ejected. The bones of this animal were also examined for strychnine. The process followed was to digest the bones in dilute hydrochloric acid, till all the earthy matter was dissolved out. The solution so obtained was filtered through muslin, placed in an evaporating basin on a sandbath, and raised to a temperature verging on 200° F. Concentrated sulphuric acid was added till it ceased to cause any further precipitation; the mixture was allowed to cool and settle, when the supernatant liquid was siphoned off. To this solution, pulverized chalk was added till the former was nearly neutralized, when the mixture was again allowed to settle, and the liquid being withdrawn, was placed in a bottle, along with animal charcoal, and agitated repeatedly during forty-eight hours. The charcoal was subsequently treated with alcohol, the alcoholic extract evaporated to dryness, and tested with bichromate of potash and sulphuric acid. No *satisfactory* evidence of the presence of strychnine in the bones was obtained.

The above experiments demonstrate that an animal poisoned by a minimum dose of strychnine, may live twelve hours after partaking of that alkaloid, and yet quite distinct evidence of the administration of the poison will be found in the remains of the animal after its death. The comparatively lengthened period during which the Scotch terrier dog survived its minimum dose of strychnine, as contrasted with the white dog or black dog which received much larger doses, led me at first to surmise that possibly, as a general rule, the rapidity of the physiological symptoms might be taken as an index of the quantity of strychnine actually administered; but the following experiments give no countenance to such an opinion.

Through the kindness of Mr. Williamson, Veterinary Surgeon, I had placed at my disposal three healthy greyhounds, which had been handed over to him for destruction. These dogs were condemned to death for an over-display of their hunting propensities, in worrying a flock of sheep, and were in every respect in good condition. Two of these three animals formed the subjects of the following experiments :—

THE FIRST GREYHOUND—FOUR YEARS OLD.

	0 minute.	3 grains strychnine were placed on its tongue.
	38 minutes.	Showed symptoms of uneasiness.
	53 “	Repeated rising and running about—each side being alternately spasmodically affected.
	57 “	Heavy breathings.
	59 “	Ran about at signal.
1 hour.		Leapt from the ground, throwing its head backwards, and fell in a tetanic fit.
1 “	2 “	Repose. Gentle breathing.
1 “	3 “	Spasms. Heavy breathing.
1 “	5 “	Repose. Gentle breathing.
1 “	30 “	Death.

THE SECOND GREYHOUND—FIFTEEN MONTHS OLD.

0 minute.	1 grain strychnine on tongue.
8 minutes.	Uneasy.
13 “	More uneasy.
16 “	Very uneasy.
18 “	Tetanic spasms.
19 “	Heavy breathing.
21 “	Jaws clenched. Repose.
23 “	Spasms. Heavy breathing.
26 “	Repose.
28 “	Spasms.
29 “	Repose.
33 “	Death.

It will thus be seen that the first greyhound, which received three grains of strychnine, resisted the spasmodic symptoms for one hour, and was killed by its large dose in one hour and a half; whilst the second greyhound, which had partaken of one grain of strychnine, was overpowered by tetanus in eighteen minutes, and died in thirty-three minutes. In other words, the dog, with the three grains of strychnine to battle against, withstood their preliminary action, and combated with their fatal designs, for periods of time three times greater than those observed in the instance of the dog which received only one grain of strychnine. Some allowance must of course be granted for the diversity in the ages of the two greyhounds; but, notwithstanding that, I am inclined to believe that no dependence can be placed on the time of the duration of the physiological symptoms, as an index of the total quantity of strychnine given to an animal. Indeed, were the above experiment alone taken as evidence on this point, we would be compelled to assume the rather strange theory, that the results of the action of strychnine on the animal system were *in time* exactly in the inverse ratio of the amount of the poison administered.

I have now more particularly to refer to the influence which the putrefactive agents exert on strychnine, and to the possibility of detecting that alkaloid in the remains of an animal which has been buried for some time. Three years and a half ago, a large dog, about twelve years old, belonging to the Messrs. Doull, of Edinburgh, was supposed to have slightly injured a child, and from the popular notion of the tendency of such a hurt to lead to hydrophobia, should the inflicter of it ever go mad, the dog was ordered by the police to be destroyed. The late proprietors of the animal (who are also my informants) accordingly gave it about four grains of strychnine, made up into a bread pill of the size of a small marble, and enclosed in a bread roll. In three-quarters of an hour spasms came on, and shortly thereafter, being surprised at the length of time the dog lived, the performers of the experiment hit the animal on the head with an iron instrument, and it then ceased struggling. When dead, the dog was placed in a large box and buried. In company with the late proprietors of the dog, as also my assistant, Mr. Allan G. Mackay, I recently exhumed the coffin and its contents. The latter consisted of the bones of the dog, loosely covered with a more or less thick layer of adipocere and hair, intermingled with some dark coloured earthy matter. The shell was found four feet below the surface of the ground, resting on a clayey soil, above which was a stratum of garden earth. On the exterior surface of the bottom of the coffin was found a fatty matter, of the consistence of butter, which had evidently oozed through the wooden plank, to which it still adhered.

The following parts were examined for strychnine.

A. Adipocere and hair.
B. The earthy matter from the region of the stomach.
C. The earthy matter from all other parts.
D. The fatty matter on bottom of coffin.
E. The coffin roughly cleaned.
F. The bones with loosely adhering decayed matter.

Each of the various parts was treated separately by the oxalic acid and charcoal process previously detailed. The coffin was previously broken into splinters, and the bones smashed into fragments. The other parts were reduced to as fine a state of division as possible. On being tested, strychnine was distinctly detected in the extract from (1) the bones and (2) the coffin, but indistinctly and unsatisfactorily in (1) the adipocere and hair, (2) the earthy matter from the region of the stomach, (3) the earthy matter from other parts, and (4) the fatty substance from the bottom of the coffin. The greater portion of the bones, after being treated with oxalic acid, were placed in dilute hydrochloric acid, and examined in the same manner as that followed with the bones of the SCOTCH TERRIER DOG, and no strychnine was found. Another portion of the bones was treated with dilute hydrochloric acid, and the acid solution nearly neutralized with chalk, and digested with charcoal; whilst a third portion was acted upon by dilute sulphuric acid, nearly neutralized with chalk, and the solution decanted off, and agitated with animal charcoal. In neither instance was strychnine detected. Two points in this inquiry are worthy of notice: the first is, in reference to the death of the dog. It is difficult to come to a conclusion regarding the particular agent which caused its decease. Two forces were at work, viz., the strychnine and the iron instrument. If the strychnine was the immediate cause of death, this case remains as an instance of ordinary poisoning by strychnine, but if the death was hastened by the blow which was dealt externally, then the case assumes a new aspect. Granting that the blow hastened the death, and of necessity we admit that, by so lessening the period during which strychnine could be allowed to diffuse itself through the animal system, we diminish the chances of finding it where it was found in greatest quantity, viz., surrounding or in the bones. The second point I wish to allude to, is the presence of numberless maggots, &c., preying on the remains of this ancient poisoned dog.

As another instance of the possibility of finding strychnine in the remains of an animal poisoned by strychnine, I have to bring forward the results of my examination of the *débris* of a small house terrier destroyed by that poison two years and a half ago. I am indebted for this case to my assistant, Mr. John J. J. Kyle (a relation of the late proprietor of the dog), who kindly exhumed and brought to me the bones covered with a mouldy substance, as also the earth immediately surrounding these. The examination was conducted as in the previous instance, and strychnine was detected in the oxalic acid extract of the bones. The earth did not yield any evidence of the poison, neither did the bones (after treatment with oxalic acid) when acted on by hydrochloric acid. There were not so many portions to examine in the instance at present under review, as the dog had not been buried in a coffin, so that the various parts were not kept together.

Whilst prosecuting these inquiries, my attention was directed to certain powders, ostensibly sold as *vermin killers*, and which are doubtless very useful for the purposes they are sold for. There are two of such which specially call for notice here, as they are in greater part composed of strychnine in a finely divided state. I refer to "Hunter's Infallible Vermin and Insect Destroyer," and "Battle's Vermin Killer." Both are regularly sold in paper packages to any one who chooses to ask for them, and pay the sum of threepence. That both "killers" contain severally as much strychnine as is sufficient to be fatal to man, may be at once observed by examining the quantity furnished in each packet; but that there might not be the slightest doubt on the subject, I have given one of Hunter's packages to a GREYHOUND, and a second to an ENGLISH TERRIER DOG. In both instances, the animals were most violently affected by tetanus, and died in a shorter time than any other animal I have poisoned by the pure strychnine itself. Not only so, but on examination of the remains of the animals, strychnine was detected in every part. It is surely time that some restriction should be put upon the sale of strychnine and other deadly poisons, either pure, or mixed with some slight colouring matter. It is notorious that gamekeepers and other servants of landed proprietors have been long in the habit of strewing strychnine embedded in the carcases of smaller animals, over the lands they protect, for the avowed purpose of destroying vermin; but where so much risk attends the procedure, and the chances of the wrongful application of the strychnine are so many, it appears much to be desired that the present partially restricted sale of pure strychnine for purposes which are not strictly medical, and the altogether free sale of coloured strychnine in packets which do not bear its name, should be at least circumscribed, if not entirely prohibited.

APPENDIX.

My assistant, Mr. John J. J. Kyle, has succeeded in detecting strychnine in the stomach and intestines of three full-grown mice, to which the alkaloid had been administered along with cheese. The process he followed was that of Stas, using chloroform instead of ether. He was not successful in demonstrating the presence of strychnine in the other organs.

ORIGINAL AND EXTRACTED ARTICLES.

THE BOTANY OF THE CRIMEA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

DEAR SIR,—I have taken the liberty of writing the following paper to you, thinking you might be interested in the botany of the Crimea. I was one of the students who attended the lectures provided by the Pharmaceutical Society in 1855, from which I received much pleasure and instruction, as I am sure every one who attended them must have done. I was unfortunately only three months in the Crimea, and consequently my observations of the country must necessarily be limited, but, such as they are, I lay them before you. I was likewise much inconvenienced from the want of botanical books, and had it not been for a friend of mine, I could not have done the little I have. I was under canvas the whole time I remained in the Crimea, but I managed, with the aid of some rough grey Turkish paper which I fortunately procured at Kadikoi, to preserve a good many of the plants that I collected.

The climate of the Crimea is, as I suppose you are aware, extremely hot in summer, and piercingly cold in winter—the thermometer frequently sinking to 11°, and I believe sometimes even lower. Now this would be thought extremely trying to even some of our native delicate plants, and yet the vine grows here in great luxuriance and perfection, with no protection whatever from the winter's cold; and some of the wines produced from the Crimean grape may vie in flavour with some of the best of France. The general vegetation of the Crimea is extremely luxuriant. A few days after the disappearance of the snow, the plants began to spring up all around, as if by magic; and when I left the Crimea in May, you could walk literally on a carpet of flowers.

I think a slight notice of the geological formation of the Crimea will not be out of place here, before I go on to enumerate the plants that I either collected or noticed. The predominant rock in the southern portion of the Crimea is limestone; this varies from the hard limestone of Balaclava to the shelly chalk of Inkermann; about Kamara, the hills are chiefly composed of conglomerate, and the soil below seems to be formed of this rock, decomposed and reduced to powder by the action of the heavy rains and frost. Near Tchergoum sandstone is plentiful; here the Tchernaya pursues its course between banks of soft sandstone for some distance. From the Mackenzie and Feduichine hills, whose aspect is southerly and exposed to the full force of storms of wind and rain from the west and south-west, the soil has been washed away and their cretaceous composition exposed, their white sides contrasting strongly with the darker colour of the dome-shaped hills of Jura limestone, or oolite, which bound the numerous ravines or valleys at their base. In most of the rocks are fossil remains of marine animals, proving clearly the once submerged condition of the country; blocks of greenstone are found, containing Ammonites from an inch to a foot, or even more, in diameter, of many species, besides many univalves and bivalves, amongst which Nautilus and Ostrea abound. Detached boulders of granite are also found here and there on the surface.

One of the first plants to make its appearance in the Crimea and herald the approach of spring is the snowdrop; this is almost precisely the same as our English one, only it struck me that the leaves are generally much wider. This is succeeded by the crocus, which covers the hills, and which is not the saffron crocus, as stated by some person writing from the Crimea. Just as the gay flowers of the crocus are disappearing, violets and primroses flower in great profusion; some of the latter are extremely beautiful, being all shades of pink and lilac. It is the beginning of April, and the hills are now covered by the bright blue flowers of the *Scilla bifolia*, forming a pleasing contrast with the beautiful green carpet from which they spring. The *Mercurialis perennis* and *Ranunculus Ficaria* now cover most of the hills, and the *Asplenium Trichomanes* and *A. Ruta muraria* are found on most of the shady rocks, along with another fern, which is, I think, peculiar to the Crimea. About a mile from Kamara, in a northerly direction, are some rocks, called by the men the "Beehive Rocks;" at their foot the *Fumaria cava* grows with brilliant yellow flowers. On ascending the rock, I found an old tree covered with *Polypodium vulgare*, which I at once appropriated to myself. The *Euphorbia amygdaloides* is plentiful amongst the brushwood which covers the hills, together with many other species.

May comes in, and the vegetable kingdom receives fresh vigour from the beautiful weather that we now enjoy; the earth is beautifully variegated with the different species of *Veronica*, *Salvia*, *Vicia*, *Lathyrus*, and the different species of *Orchis*, which grow to a great size, some of them being two feet or more in height, and of the most fantastic shapes and beautiful colours, while others are of the same uniform green colour, stems, leaves, and flowers. On the west side of Balaclava, on the heights, the *Iris pumila* grows in profusion, contrasting with the large yellow spikes of the *Asphodelus luteus*, which is here very common. The *Hyacinthus racemosus*, with its peculiar grape-like flowers, is rather common about Kamara.

The last botanical ramble which I had in the Crimea was about the 20th of May; in this excursion I visited the Aqueduct and Tchernaya; near the Aqueduct I found the *Reseda odorata* growing plentifully, and although much larger than that cultivated in our gardens, its scent was quite as delicate. The *Hyoscyamus niger* also grows here uncommonly fine, as does also the *Aconitum napellus*. I collected also some fine specimens of *Papaver Rhœas*, *Aristolochia Clematitis*, and a specimen of the rare *Arum trilobatum*. I noticed the *Conium maculatum* growing plentifully here.

I have made a list of all the plants I found in flower, which I subjoin:—

Asplenium trichomanes	March	Rocks near Kamara
“ ruta-muraria	“	“ “ “
Primula vulgaris	April	Hills and plains near Kamara
Crocus vernus	March	Common everywhere
Galanthus nivalis	“	Common about Kamara
Scilla bifolia	April	Hills and plains about Tchergoum and Kamara
Viola odorata	“	Hills and plains near Kamara
“ canina	“	“ “ “
“ tricolor	“	“ “ “
Ranunculus ficaria	“	Moist places near Warnoutka
Mercurialis perennis	“	Hills and plains near Tchergoum and Kamara
Arabis Alpina	“	Rocks near Kamara
Polypodium vulgare	“	Beehive rocks near Kamara
Luzula sylvatica	“	Common at Kamara
Ranunculus acris	“	Near Baidar
Draba aizoides	“	Rock near Baidar
Euphorbia amygdaloides	“	Woods “ “
Hyacinthus racemosus	“	Hills near Kamara
Leucojum vernum	“	Hill by the Tchernaya, Tchergoum
Tussilago farfara	“	Near Tchergoum
Fumaria solida	“	Common about Kamara
“ cava	“	Base of the Beehive rocks
Galium verum	May	Valley near Tchergoum
Myosotis palustris	“	Aqueduct near Tchergoum
Fragaria vesca	“	Tchergoum and Kamara
Anthemis cotula	“	“ “ “
“ nobilis	“	“ “ “
Saxifraga tridactylites	“	Rock near Tchernaya, Tchergoum
Ranunculus auricomus	“	Tchergoum
“ aquatilis	“	Tchernaya, Tchergoum
Thymus serpyllum	“	Near Warnoutka
Dianthus guttatus. Bieb.	“	Rock near the Aqueduct
Trifolium repens	“	Valley near Kamara
Taraxacum officinale	“	Near Kamara
Iris pumila	“	Heights near Balaclava
Malva sylvestris	“	Tchergoum
Capsella Bursa-pastoris	“	Near Kamara
Vicia sepium	“	Valley near Kamara
Hyoscyamus niger	“	Near the Aqueduct, Tchergoum
Aconitum Napellus	“	Near Tchergoum
Aristolochia Clematitis	“	“ “
Pyrus Malus	“	Woods near Baidar
Rosa canina	“	Valley near Kamara
“ rubiginosa	“	Dell, near bathing-place, Balaclava
Reseda odorata	“	Near Tchergoum
Coronilla Emerus	“	Hill near Kamara
Lathyrus tuberosus	“	Valley near Kamara
Arum trilobatum	“	Near Tchergoum
Orobus varius	“	Valley near Kamara
Onosma taurica	“	Hill near Tchergoum
Helianthemum vulgare	“	Near Tchergoum
Pæonia peregrina	“	Hills and valleys about Kamara
Jasminum fruticans	“	Hill near Kamara
Alyssum montanum	“	

I also collected six other species of *Euphorbia*, four species of *Veronica*, five of *Orchis*, and several *Lepidiums*, *Lamiums*, and *Vicias;* and I noticed, though not in flower, quantities of *Salvia officinalis*, *Conium maculatum*, and *Arum maculatum;* indeed, so plentiful is the latter plant almost everywhere, that in time of scarcity I should think it might be useful as food, that is, the cormus, properly prepared; the hills about Kamara are covered with the *Juniperus communis.* The following is a description of a little plant very common in the Crimea, but of which I do not know the name.

Bulb ovate, about one or two inches below ground; leaves all radical, long, narrow, recurved, pubescent, covered with very short hairs. Scape from three to four inches high, rising from the centre of the leaves, simple, cylindrical, smooth, white, terminated by a short raceme of flowers, with peduncles about the length of the petals, and long bracts. Perianth of a white colour, with a green stripe down the outside of the petal. Sepals three, petals three. Stamens six, shorter than petals; filaments smooth, flattened, ununited. Anthers yellow. Ovary three-celled, with axillary placentæ. Style smooth, simple. Stigma hardly perceptible.

Found in dry sandy soil on the hills and plains throughout the south of the Crimea. Common; flowers in March, April, and May.

The hills of the south of the Crimea are for the most part covered with a growth of brushwood, consisting of the *Corylus avellana*, *Juniperus communis*, *Carpinus betulus*, *Pyrus malus*, and the Crimean dwarf oak, &c., &c.; and these grow so thickly, that it is almost impossible to make your way through them; and as snakes and lizards abound among the dry leaves, an extended walk through these places is neither desirable nor pleasant.

I regret to say that most of my plants were spoilt in our voyage from the Crimea, being put in a damp place, where they got mildewed.

I should have made this communication to you before, but I was seized with an attack of pleuritis on our voyage to Gibraltar, and I have not been able to leave my bed for the last three weeks.

Believe me to remain, yours sincerely,
W. A. Moss,
Dispenser, 92nd Highlanders.

Hospital, 92nd Highlanders, Gibraltar,
July 10th, 1856.

EFFECTS OF THE PRESENCE OF SULPHUR IN COAL GAS.

BY FREDERICK W. GRIFFIN, PH.D.

My laboratory is supplied with distilled water from a small copper boiler set in a sheet iron case over a ring gas-burner, about five inches in diameter. Immediately above the flame nodular excrescences appear, which gradually fall off and cover the slate beneath with a considerable quantity of a flocculent greenish-white substance, amounting in a couple of months to at least half an ounce. This becomes of a dark green colour when moistened; in a larger quantity of water the greater part readily dissolves, giving a dull green solution. A portion, however, remains unacted on, but this likewise instantly dissolves on the addition of a few drops of hydrochloric acid, leaving a minute residue of black scales, which were found to consist of oxide of iron derived from the rusting of the outer case, but not more that .407 per cent. The bulk of the substance was soon ascertained to be sulphate of copper; there were also small portions of chlorine and lime (doubtless from leakage of the water within the boiler), and traces of sulphate of iron. Heated in a glass tube it gave off a copious amount of water. No turbidity was produced by mixing its solution with hydrochloric acid, nor was there the slightest smell of sulphurous acid when moderately concentrated sulphuric or hydrochloric acids were poured over it; hence it was unmixed with sulphite or hyposulphite of copper. In a quantitative examination, 31.600 grs. gave 29.888 grs. of sulphate of baryta, and 22.627 grs. yielded 7.26 of oxide of copper. Hence it will be seen to present nearly the normal composition of crystallized sulphate of copper; thus—

	Theoretical.	Efflorescence on Boiler.
Oxide of copper	32.0	32.085
Sulphuric acid	32.0	31.809
Water	36.0	

The sulphurous acid first produced from the flame probably combines with the film of oxide on the surface of the heated metal to form a sulphite of copper, which, under the influence of air and moisture, passes into the state of hydrous sulphate. Having repeatedly tested the gas, and found it free from sulphuretted hydrogen, all this sulphur must be in the form of bisulphuret of carbon. This contamination has greatly increased since the reduction in the price of the gas, no doubt from the employment of a cheaper coal, which is highly sulphurized. On several occasions when gas has escaped in the laboratory, I have gone to see whether my bottle of bisulphuret of carbon were safe, so completely has the unmistakable odour of the vapour of that substance overpowered the naphtha smell that belongs to coal gas. I need hardly dwell on the destructive effects of such gas in shops and dwelling-houses; curtains, paper-hangings, pictures, the binding of books, and metal goods of every description must be speedily discoloured or rusted by the continued action of the acid thrown off from its flame; whilst the breathing a confined atmosphere tainted with sulphurous fumes, as well as hot and vitiated, must be equally deleterious to health. Great efforts are now being made to extend the use of gas in private houses; but if its quality were not superior to that inflicted on the citizens of Bristol, I could not but regard the success of such endeavours as an unqualified evil.

Bristol School of Chemistry.

MEDICINAL AND PHYSIOLOGICAL ACTION OF CARBOAZOTIC ACID.

BY F. CRACE CALVERT AND DR. MOFFAT.

It is only within the last few years that any attempt has been made to make use of the remarkable properties which this acid presents, discovered by M. Welter, and so well described by M. Chevreul in 1809.

One of us having been called upon some years since to seek a method of preparing carboazotic acid, which should be constant in its results, and at the same time not expensive, adopted, after many trials, the process recommended by Laurent, as being that which best fulfilled the required conditions. At the same time we have to state that great precaution is necessary to obtain carboazotic acid free from indigotic and oxalic acids.

The acid which we prepared is, as M. Chevreul has said, in small plates of a very pale yellow. It gives, even in dilute solutions, a precipitate with salts of potash.

The intense bitter of carboazotic acid suggested the idea that its employment in medicine might be useful. A certain quantity of this acid, as well as of the carboazotates of ammonia, iron, nickel, and zinc, was placed in the hands of Dr. Moffat, and soon it was perceived that the above-named compounds would have therapeutic properties of great value, for they had much analogy with those of quinine.

It was remarked that the carboazotates of ammonia and iron succeeded the best, the free acid being apt to cause cramps in the stomach. Carboazotate of iron has perfectly succeeded in several cases of cephalagia, carboazotate of ammonia in cases of enemia, in intermittent fever, and hypochondria. This salt, mixed with gallic acid and opium, has several times cured obstinate diarrhœa. Mr. Moffat has himself obtained more than twenty-seven cases of different cures by means of the carboazotates. The dose of carboazotate which has been administered in pills, has been from 0.05 to 0.10 gramme per day. We are at present examining what is the minimum dose which can act on the system. That which renders the employment of these compounds exceedingly interesting is, that the patients became yellow, as if they had a severe attack of jaundice, and as in this last disease, not only the skin, but also the conjunctiva of the eye is coloured. The time necessary for this coloration seems to vary according to the patients, from two to sixteen days, but the mean has been seven days. The quantity of carboazotate which has generally produced the coloration of the skin, has been about a gramme. It disappears in two or three days after this product has ceased to be administered. We have sought to discover the presence of this acid in urine, and the following is the process which we have followed: the urine was treated by acetate of lead, rendered slightly acid by some drops of acetic acid. The abundant white precipitate which is produced was removed by filtration, and the liquor evaporated perfectly to dryness in an oil bath kept at a gentle heat. The residue treated by ether gave an ethereal extract, which, evaporated to dryness, left a slight residue, which residue, dissolved in distilled water, was divided into two parts, A and B. In A was put boiled silk, which remained white as long as the patient was not coloured, but it was otherwise during the whole time of the artificial jaundice. The depth of coloration that the silk takes augments with the quantity of carboazotate administered. The portion B was mixed with alcohol and ammonia, and then a current of sulphuretted hydrogen was passed through it for half an hour. When carboazotic acid was present, the solution became red by the formation of picramic acid, discovered by M. Gerhardt. By these means we have been able to detect 0.01 of carboazotic acid in 100 grammes of urine, even when it has been kept several days.

This colouration of the skin appears to us so important in a physiological point of view, that we are actively pursuing our researches, not only on man but also on animals. If Braconnot, who employed carboazotate of potash, did not obtain similar results, it was probably due to the insolubility of the salt employed, or that he did not use true carboazotate of potash.

REPORT OF THE

RESULTS OF PHYSICAL AND CHEMICAL INVESTIGATION,

AND OF THE

APPLICATIONS OF PHYSICS AND CHEMISTRY IN THE ARTS.

BY B. H. PAUL, PH.D., F.C.S.

Specific Heat of Elementary Substances.—M. Regnault[*] has obtained some additional data relating to the law discovered by MM. Dulong and Petit—that the specific heat of elementary substances is inversely proportionate to their atomic mass, or, in other words, that the quantity of heat requisite for raising the temperature of atomic masses one degree, is the same for all elementary substances. His previous investigations[†] have shown that the observed discrepancies between the results of experiment and the theoretical deduction, that the product of the number expressing the specific heat of any elementary substance multiplied by its atomic number, will be a constant value, arise from the circumstance that the experimental results do not represent merely the specific heat of substances, but also quantities of heat, concerned in the production of secondary effects, such as expansion, molecular change, &c., varying according to the conditions of the experiment, among which the state of aggregation and temperature are the most influential, and the variation in the product obtained by multiplying the numerical values of the specific heat and the atomic mass is further increased by the uncertainty attaching to the determination of the equivalents of some elementary substances.

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[*] *Ann. de Chim. et de Phys.*, 3, xlvi., 257.

[†] *Mém. de l'Acad. des Sciences*, xxvi.

The value obtained for this product by experiment, varies, in the case of solid elementary substances, between 2.9 and 3.3; in the case of gaseous elementary substances which conform to Mariotte's law, it is only 2.0 ; in the case of chlorine and bromine, which do not conform to this law, it is 2.18.

	Atomic number.	Specific heat for equal weights.	Specific heat for atomic masses.
Osmium	99.6	0.03063	3.050748
Rhodium	52.2	0.05408	2.822976
Iridium	99.	0.03630	3.604700
Aluminium	13.7	0.20556	2.816172
Corrected for impurity		0.21810	2.987970
		0.21224	2.907688
Corrected for impurity		0.21430	2.935910
Cobalt	29.5	0.10696	3.155320
Nickel	29.6	0.11095	3.284120
Sodium	23.0	0.29340	6.748200
Tellurium	64.2	0.47370	3.141154
Selenium (metallic)	39.5	0.07616	2.998320
“ (vitreous)		0.10310	
“ at low temperatures	(metallic)	0.07468	
	(vitreous)	0.07446	

The osmium was a spongy, slightly coherent mass, with bluish metallic lustre. The value obtained for the specific heat confirms the formula assigned to osmic acid ($Os\,O_5$) and the other compounds of this metal.

The rhodium was a forged cylinder. The lower value of the product is probably owing to the presence of iridium.

The greater value of the product for iridium may be owing to the presence of other metals—most probably rhodium or ruthenium—or to the atomic number assigned to it being incorrect.

The corrected product for aluminium is within the limits of variation. The determination of the specific heat confirms the formula $Al_2\,O_3$ assigned to alumina.

Both the cobalt and nickel contained carbon.

The specific heat of sodium shows that the atomic number should be only half the equivalent, and that the formula of sodium must be $Na_2\,O$.

Allotropism of Selenium.—M. Regnault[*] has also observed that selenium is capable of assuming two different molecular conditions—the metallic and the vitreous—presenting very different characters, and that the transition from one state to the other is accompanied by a very considerable evolution of heat.

When selenium is heated until perfectly liquid, and then poured into a mould of brass or glass, it solidifies as a black shining mass, the fracture of which is quite like that of obsidian. The splinters appear ruby coloured by transmitted light. The powder is grey, the streak red. The red selenium precipitated by sulphurous acid is in the vitreous condition.

When selenium is heated very gradually to 203° F., its temperature suddenly rises within a few minutes to 392° or 446° F., and its physical condition is entirely changed. In this state it has a bluish-green colour at the surface, and metallic lustre. The fracture is granular and metallic, like grey cast-iron. The mass is sensibly malleable, and conducts heat better than vitreous selenium.

Constitution and Properties of Ozone.—Prof. Schönbein[†] has shown that under certain conditions, oxygen is converted into a substance, which he calls ozone, possessing characters very different from those of ordinary oxygen. Some difference of opinion exists as to whether this substance is allotropic oxygen, or whether it is a compound of oxygen with hydrogen, and also, whether the ozone produced under different conditions is always the same substance. Dr. Andrews[‡] has investigated this question with great care, and has come to the conclusion that the ozone generated in the electrolysis of water does not contain hydrogen, but is simply allotropic oxygen. The method adopted, was to pass dry electrolytic oxygen first through a solution of iodide of potassium and hydrochloric acid, then through concentrated sulphuric acid in bulb tubes, afterwards estimating the quantity of iodine liberated, and comparing this result with the increase of the weight of the two bulb tubes. The results of five experiments were:—

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[*] *Ann. de Chim. et de Phys.*, 3, xlvi., 25.

[†] *Pharmaceutical Journal*, xiv., 216, 323, 371.

[‡] *Philos. Trans.*, 1856.

Quantity of ozoniferous gas passed through apparatus.	Quantity of ozone calculated	
	from increase of weight.	from iodine liberated.
10.20 litres	0.0379 grm.	0.0386 grm.
2.72 "	0.0107 "	0.0100 "
2.86 "	0.0145 "	0.0138 "
6.45 "	0.0288 "	0.0281 "
6.80 "	0.0251 "	0.0273 "
Mean result	0.1179	0.1178

It is evident, from the close agreement between these results, that the ozone did not contain hydrogen; for if ozone were HO_3, the increase of weight in the mean result should have been 0.1841 instead of 0.1179.

This result is directly opposed to that obtained by Hr. Baumert, and very generally received in Germany, according to which ozone would be HO_3. However, Dr. Andrews has shown that in Hr. Baumert's experiments there was a source of error, which will account for the difference between the results obtained by him, and those which would indicate that ozone does not contain hydrogen. This source of error consists in the presence of a very small amount of carbonic acid in the electrolytic oxygen. Then, as Hr. Baumert used a neutral solution of iodide of potassium, in which potash would be formed by the ozone, the carbonic acid would be absorbed, and the weight of the apparatus increased beyond the amount referable to the action of ozone.

The amount of ozone produced in the electrolysis of water appears from these experiments to be tolerably constant, the average being 0.0041 grm. in the litre, or about $\frac{1}{360}$ by weight. A second series of experiments were made with the view of ascertaining whether water is produced when ozone is subjected to the influence of heat. Dry electrolytic oxygen was passed through a bulb tube, heated to 400° C., and then through a bulb tube containing sulphuric acid. The results of two experiments were:—

Quantity of gas.	Quantity of ozone.	Increase of weight.
6.8 litres	0.027 grm.	0.00033 grm.
9.6 "	0.038 "	0.00050 "

If ozone were HO_3, the increase of weight would have been 0.010 and 0.014 grms.

That ozone does not contain nitrogen was also proved by its production under conditions that rendered the absence of nitrogen certain.

The temperature at which the conversion of ozone into ordinary oxygen takes place was found to be between 230° and 240° C. The conversion seemed to depend upon the amount of ozone in the gas. Even at 100° C. the conversion takes place, though very slowly. In contact with water vapour, the conversion is instantaneous at 100° C.

A comparative examination of ozone produced by electrolysis, by the spark discharge, or by the contact of phosphorus with atmospheric air, showed that its properties are the same, whatever may be its source, and that it is not a compound substance, but allotropic oxygen.

At ordinary temperatures ozone is not absorbed by water, but by contact with water it is to some extent altered, so that it is impossible to collect ozone, largely diluted with air, in a jar over water. Alkaline solutions also alter ozone, but do not absorb it. By contact with peroxide of manganese, ozone is converted into ordinary oxygen. The odour and bleaching action are always the same.

The simple nature of ozone is further confirmed by the facts that it may be produced from pure dry oxygen by the electric spark, and that oxygen may be completely converted into ozone in the presence of iodide of potassium solution.

M. Hozeau* has also investigated this question, chiefly in reference to the oxygen eliminated from binoxide of barium, by the action of sulphuric acid, and the ozone generated by electrolysis of water. His experiments and results are almost a reproduction of those already described. He has also pointed out some conditions influencing the production of ozone by electrolysis.

1. The composition and temperature of the liquid being constant, the amount of

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* *Compt. Rend.*, xliii. 84.

ozone produced increases with the intensity of the pile, but not proportionately. Thus eight of Bunsen's elements produced 0.00195 grm., and eighty elements 0.00429 grm. in equal volumes of gas.

2. The intensity of the pile and the composition of the liquid being nearly constant, the amount of ozone produced decreases as the temperature increases.

3. The temperature of the liquid and the intensity of the pile being nearly constant, the amount of ozone produced increases with the amount of sulphuric acid, but does not seem to be proportionate to it.

It follows hence, that in order to obtain the largest possible quantity of ozone by means of a given intensity, it is necessary to employ water with a very large proportion of acid. With eight of Bunsen's elements, ozone is not generated from water containing only $\frac{1}{10}$ its volume of acid, even after the addition of a little chromic acid; while it is produced by two elements from water mixed with five times its volume of acid.

The amount of ozone in oxygen, produced under various conditions, was found to vary from 0.002 to 0.007 grm. in the litre.

Prof. Van der Willigen* states that he has observed the production of ozone when a thin platinum wire, about two inches long, is fixed between the arms of a Henley's discharger, which is included in the circuit of a Grove's battery of six cells. The wire soon becomes white hot, and the odour of ozone may be recognized along the whole length, but most distinctly at the positive end, at that pole where oxygen would be eliminated in the voltameter.

Equivalent of Antimony.—The equivalent number 129 (H=1) or 1612.9 (O=100) was determined by Berzelius† in 1818, from the amount of antimoniate of antimony (SbO_3, SbO_5) obtained by oxidizing the metal with nitric acid, evaporating, and igniting the residue.

Hr. Schneider‡ has recently determined the equivalent number of antimony with great care analytically, from the amount of antimony obtained by reducing sulphide of antimony by hydrogen. The maximum, minimum, and mean results of eight experiments were:—

Antimony......	71.441	....	71.519	....	71.480
Sulphur.........	28.559	....	28.481	....	28.520

Hence the equivalent number of antimony would be 120.3 or 1503.80.

The sulphide of antimony used was that occurring at Arnsberg, which is remarkably pure, free from any recognizable amount of arsenic, lead, copper, or iron, and contains only about 0.33 per cent. quartz that cannot be separated mechanically.

When the operation was slowly conducted, the reduction of the sulphide was effected at such a temperature that only a very minute quantity of sulphide of antimony was volatilized; this was estimated in each instance. It was found that there was no loss of antimony from formation of antimonietted hydrogen. However, the separation of the last trace of sulphur proved to be difficult, and for this reason the residual antimony was dissolved by nitro-hydrochloric acid, and the sulphur estimated as sulphate of baryta; it never amounted to more than 0.1 per cent.

As a consequence of this correction of the equivalent of antimony, the theoretical percentage composition of the antimony compounds will be altered. Many analytical results which have hitherto been regarded as more or less incorrect, prove to be more correct than those which correspond with the former equivalent, and the circumstance that many of the results, which do not agree with the former equivalent, have been obtained by Prof. Rose, serves as confirmation of Hr. Schneider's determination of the equivalent. Thus, red antimony ore, which, according to the former equivalent, should contain 76.25 per cent. antimony, was found by Rose to contain 75.04, while, according to Hr. Schneider's equivalent, it should contain 75.06 per cent. In the chloride of antimony ($Sb\,Cl_3$) Prof. Rose found 53.27 per cent. antimony, and in the pentachloride 40.56 per cent. antimony, both numbers agreeing closely with those derived by calculation from the equivalent determined by Hr. Schneider.

The formulæ of the antimoniates analyzed by Hefter, will, by means of this correction of the equivalent of antimony, become analogous to those of other neutral salts, the oxygen ratio of most of them being 1 : 5.

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* *Ann. der Physik und Chemie*, xcviii., 511.

† Schweigger's *Journ.*, xxii., 69. ‡ *Annalen der Physik und Chemie*, xcviii., 293.

It may also be pointed out that the arithmetic mean of Hr. Schneider's equivalent of antimony and that of phosphorus, determined by Schrötter, is very nearly the equivalent number of arsenic as determined by M. Pelouze:

$$\frac{120.3+31}{2}=75.65;$$

so that there would seem to be a relation between the equivalent numbers of these substances, similar to that existing between the equivalent numbers of calcium, strontium, and barium, or those of chlorine, iodine, and bromine.

H. Rose[*] adds, in confirmation of Schneider's determination, the results of analyses of terchloride of antimony, obtained by decomposing the solution, containing tartaric acid, by sulphuretted hydrogen, and estimating the chlorine in the filtrate. By this means he found the percentage composition—

Antimony	53.15
Chlorine	46.85
	100.00

Salts of Sesquioxide of Manganese.—Hr. Carius[†] describes sesquisulphate of manganese as a dark green powder, that may be heated to 320° F. without losing oxygen. It is almost insoluble in concentrated sulphuric or nitric acid; when heated with concentrated sulphuric acid to the boiling point, oxygen is gradually evolved and protosulphate of manganese formed. It is dissolved by hydrochloric acid, forming a brown coloured liquid that evolves chlorine when heated. It absorbs moisture from the air very rapidly, forming a clear, violet-coloured liquid, soon becoming brown and turbid from separation of hydrated sesquioxide. It is decomposed by water and by dilute acids, yielding a brownish-red basic sulphate of sesquioxide. In the presence of protosulphate of manganese the sesquisulphate is dissolved by dilute sulphuric acid to a dark red liquid, in consequence probably of the formation of a soluble double salt.

Lactic Acid in Extract of Taraxacum.—Prof. Ludwig and Hr. Tod[‡] have found that this extract contains lactic acid. They also examined a salt extracted from *Mellago taraxici*, and found that it was lactate of lime ($CaO, C_6H_5O_5+5HO$).

Composition of Veratria.—Dr. Merck[§] gives the following formulæ for veratria, &c.:—

Veratria	$C_{64}H_{52}N_2O_{16}$
Double chloride of gold and veratria	$C_{64}H_{52}N_2O_{16}HCl+AuCl_3$
Sulphate of veratria	$C_{64}H_{52}N_2O_{16}HO, SO_3$.

The crystals of veratria are colourless, efflorescent, insoluble in water, but become opaque and lose their form. It completely neutralizes acids. With concentrated sulphuric acid, veratria gives a yellow colour passing into red; with concentrated hydrochloric acid, it gives a dark violet solution, especially when heated.

Formation of Ferricyanide of Potassium.—Dr. Playfair[‖] finds that the yellow salt ($2\,Cfy, 2\,K, 2\,NH_4$) obtained by acting upon the double ferrocyanides of the earthy metals and potassium, with carbonate of ammonia, is converted into ferricyanide of potassium when the solution is boiled with binoxide of manganese, ammonia being eliminated.

Paracyanogen.—Dr. Playfair[¶] has observed that when hydrocyanic acid is decomposed, under such circumstances that the hydrogen is oxidized, paracyanogen is produced. When hydrocyanic acid is added to a mixture of ferricyanide of potassium and potash in equivalent proportions, the liquid becomes dark coloured, a small quantity of gas is disengaged, and a bulky dark-coloured precipitate separates, especially when the liquid is warm. The precipitate is scarcely soluble in cold water, is dissolved readily by dilute caustic alkalies, and is again precipitated by acids. This substance appears to be analogous to paracyanogen, but the examination has not been completed.

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[*] *Annalen der Physik und Chemie*, xcviii., 455.

[†] *Ann. der Chem. und Pharm.*, xcviii., 58.

[‡] *Archiv. der Pharmacie*, cxxxvi., 13.

[§] *Ann. der Chem. und Pharm.*, xcv., 210.

[‖] *Quarterly Journal of the Chemical Society*, ix., 128.

[¶] Ibid., ix., 129.

Action of Heat upon Sulphocyanide of Potassium.—Hr. Nöllner[*] has observed that when a small quantity of sulphocyanide of potassium is melted in a porcelain crucible it becomes brownish-green after some time, and then of a fine blue colour, like indigo or ultramarine. When the mass is allowed to cool, it does not appear to have undergone any decomposition, but becomes white again, and dissolves completely in water, the solution presenting the usual reactions.

Adipocire.—Dr. Wetherill[†] has examined several specimens of adipocire, and found it to consist chiefly of stearic and palmitic acids, in one instance, combined with lime, but never containing glycerine, cholesterine, or ammonia. Some experiments that he made appear to show that adipocire originates from the fat of the body by loss of glycerine and oleic acid, and that it is not formed from muscular substance.

Para Nut-Oil.—Mr. Caldwell[‡] finds that the oil of the fruit of *bertholletia excelsior* consists of stearine, palmitine, and oleine.

Phaseomannite.—In estimating the amount of sugar in some green vegetables, by the fermentation method, Hr. Vohl[§] observed that the juice of the unripe fruit of *Phaseolus vulgaris* has a very sweet taste, and that after it has been fermented, this sweetness is scarcely at all reduced. This proved to be owing to the presence of a saccharine substance analogous to mannite. This substance crystallizes like mannite, is abundantly soluble in water or dilute alcohol, very sparingly soluble in absolute alcohol or ether, and is purgative. In dry air it loses water of crystallization; at 212° F. it loses 16.5 per cent. Between 302° and 320° F. it melts. With sulphate of copper and caustic potash it gives a clear blue solution, from which suboxide of copper is precipitated by boiling. The composition of the substance dried at 212° F. is

$$\begin{array}{lr} \text{C} \ldots\ldots\ldots\ldots & \left.\begin{array}{r} 41.0475 \\ 6.8649 \\ 52.0876 \end{array}\right\} = C_{21}\,H_{21}\,O_{20} \\ \text{H} \ldots\ldots\ldots\ldots & \\ \text{O} \ldots\ldots\ldots\ldots & \\ \hline & 100.0000 \end{array}$$

It dissolves in cold sulphuric acid without blackening, and in nitric acid without evolution of gas or production of colour.

Preparation of Coumarine.—Prof. Wöhler[||] states that coumarine may be most advantageously obtained by digesting tonka beans, cut into small pieces, for some considerable time with alcohol of 80 per cent., at a temperature near the boiling point. The alcoholic liquid is then separated by filtration, the alcohol distilled off, and when the residue begins to appear turbid, water is added, by which means the coumarine is precipitated in a crystalline state. The liquid is heated with the precipitate to the boiling point, passed through a filter, which retains the fat, and the coumarine crystallizes out on cooling.

Artificial Production of Urea.—It has frequently been pointed out that the chemical character of urea agrees with that which would be presented by an hypothetical amide of carbonic acid, but since urea had not been obtained in a manner analogous to the production of amides, and since most of its compounds would, according to the number of equivalents, contain a double atom of carbamide, the nature of the constitution of urea has not been decided.

Hr. Natanson[¶] has made some experiments in reference to this question, and he considers that the results furnish decisive evidence that urea is identical with carbamide.

When a mixture of carbonate of ethyl and ammonia is heated to 212° F. in a sealed tube, urethane ($C_6\,H_7\,NO_4$) alone is produced, but when the temperature is raised to the boiling point of urethane, 356° F., this substance is converted into urea by the action of the ammonia remaining. In the upper part of the tube, a sublimate of undecomposed urethane is deposited, the liquid contains urea. When this liquid is evaporated to dryness and kept for some time at a temperature of 212° F., the urethane is volatilized, and urea remains, or the urethane may be more completely separated by treating the dry mass with ether.

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[*] *Ann. der Physik und Chemie*, xcviii., 189.

[†] *Trans. American Philos. Soc.*, xi.

[‡] *Ann. der Chem. und. Pharm.*, xcviii., 120.

[§] *Annalen der Chemie und Pharmacie*, xcix., 125.

[||] *Annalen der Chemie und Pharmacie*, xcviii., 66.

[¶] *Ann. der Chem. und Pharm.*, xcviii., 287.

The substance thus obtained presents all the characters of urea.

In 1838 M. Regnault observed that by the reaction of phosgene gas (C Cl O) with ammonia, a white mass is produced, apparently a mixture of carbamide and chloride of ammonium. He was, however, unable to separate these substances, and as he did not obtain any precipitate in the water solution by addition of nitric acid, although after the addition of urea a precipitate was produced, he inferred that the carbamide was different from urea.

Hr. Natanson finds that the white substance thus produced does contain urea. The most essential condition for its production in this way is the perfect dryness of the gases, and the difficulty of effecting this is the reason that urea is generally produced in less proportion than chloride of ammonium, consequently the test with nitric acid, which requires a somewhat concentrated solution of urea, does not furnish any indication of the presence of this substance in the water solution of the product.

The phosgene gas is best prepared by passing carbonic oxide through boiling perchloride of antimony, and is brought in contact with dry ammonia in a capacious glass globe. The white substance thus obtained is mixed with baryta water in excess, so as to decompose the chloride of ammonium, the solution evaporated to dryness over sulphuric acid, and urea dissolved out by absolute alcohol.

Production of Formic Acid.—M. Berthelot* has succeeded in obtaining formic acid by heating carbonic oxide with hydrate of soda, and finds that this acid may be obtained readily by heating oxalic acid with an equal weight of glycerine and about $\frac{1}{10}$ water, very gradually to 219° F. The glycerine does not take any part in the change other than determining the combination of the carbonic oxide with the elements of water, and the amount of formic acid obtained in this way is nearly as large as that indicated by calculation.

Carbonic Oxide may be obtained in the same manner very pure, by raising the temperature of the mixture after the evolution of carbonic acid has ceased; and this method is preferable to heating oxalic acid or ferrocyanide of potassium with sulphuric acid, for, according to HHrn. Grimm and Ramdohr,† the carbonic oxide obtained from the latter source requires to be washed, to separate carbonic and sulphurous acids.

Testing for Iodine in Water.—Prof. Liebig‡ recommends the addition of iodic acid, or of alkaline iodate, to the water before testing with starch solution and acid, so that, by reason of the liberation of iodine, by the reaction of iodic acid and hydriodic acid or iodides, the colour reaction may be augmented and rendered sensible in cases where the quantity of iodine present is too small to be recognized in the usual manner. In applying this test to mineral water, Prof. Liebig observed that, before adding iodic acid, the blue colour was produced by hydrochloric acid,—perfectly free from chlorine and iron,—as well as by chlorine water, by nitric acid, or any of the usual reagents. Consequently, there must have been some substance in the water that liberated the iodine on the addition of acid. The water contained nitrates in considerable amount, but it did not appear certain that the reaction was altogether owing to their presence.

When the water to be tested for iodine contained reducing substances, such as sulphurie acid, Prof. Liebig's method would be inapplicable. Dr. Knop§ uses in this case a solution of bromate of potash added very cautiously to the liquid, mixed with starch, at intervals of five or ten minutes, in sufficient quantity to oxidize the sulphurous acid and liberate the iodine.

Influence of Hydrochloric Acid on the Formation of Sulphides.—Hr. Martin‖ has observed that lead, cadmum, antimony, tin, mercury, bismuth, copper, and silver, are not entirely precipitated as sulphides, by sulphuretted hydrogen, from solutions containing a large amount of hydrochloric acid, although the precipitation is complete when the amount of acid is reduced by dilution with water. The amount of hydrochloric acid sufficient to prevent precipitation of the sulphides is least in the case of lead, greatest in the case of silver, which requires rather more than enough to dissolve chloride of silver. The quantity of metal remaining in solution is proportionate to the amount of hydrochloric acid in the liquid, and independent of the quantity of metal. In the case of metals, which form two series of compounds, the portion remaining in solution, under these circumstances, is reduced by sulphureted hydrogen to a state corresponding with the lowest oxide. These facts show, that in precipitating metals belonging to this series, the solutions should be dilute and not very acid, and that they cannot be separated completely by means of sulphuretted hydrogen, from zinc, nickel, or cobalt, which are partially precipitated as sulphides from dilute solutions containing little acid.

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* *Compt. Rend.*, xlii., 447.

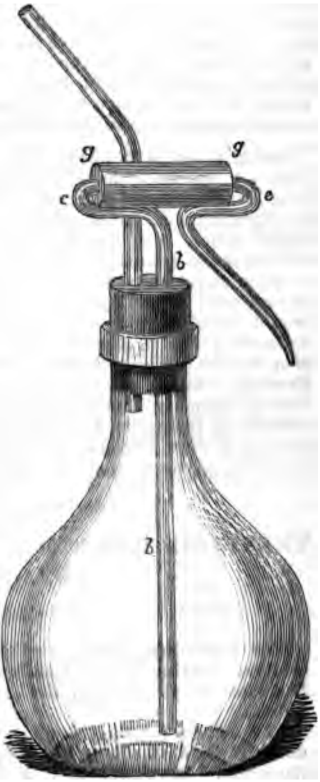
† *Ann. der Chem. und Pharm.*, xcviii., 127.

‡ *Ann. der Chem. und Pharm.*, xcviii., 51.

§ *Chem. Centralblatt*, 1856, p. 497.

‖ *Journ. für prakt. Chem.*, lxvii., 371.

Loss of Silver in Cupellation.—Mr. Hambly[*] finds that the loss of silver is proportionate to the amount of lead used, but that the loss increases in a less ratio than the amount of lead. The loss seems slightly greater in the cupellation of small quantities of silver.



An Improved Wash-Bottle has been devised by Hr. Vogel[†] for washing a precipitate out of a beaker. The discharge tube, *b c e*, consists of two pieces, connected by a short piece of wider tube, with corks in each end, so that the end, *e*, may be turned in any direction without moving the flask.

Preparation of Phosphorus.—Hr. Fleck[‡] describes an improved method of obtaining phosphorus. The clean, broken bones, from which fat has been separated as completely as may be possible, are digested in dilute hydrochloric acid, by which means chloride of calcium and acid phosphate of lime (CaO, 2 HO, PO_5) are produced. When the calcareous substance is completely extracted, the cartilaginous mass is washed, immersed in lime water, again washed, and used for the preparation of gelatine. The solution is evaporated in earthen pans, until its specific gravity is about 1.4, then run off cool. The acid phosphate of lime that crystallizes is separated from the mother-liquor, pressed between cloths, or spread upon a porous slab, from under which air can be exhausted, and by this means the adherent mother-liquor is separated. It then appears as a white gritty powder with pearly lustre. The residual phosphoric acid is separated from the mother-liquor, as phosphate of lime, by means of lime. The dry acid phosphate is warmed and mixed with a fourth its weight of charcoal, the mixture sifted, and introduced into the retorts. Hr. Fleck recommends the use of clay cylinders, like gas retorts, for the distillation. The discharge tubes of five of these cylinders terminate in a receiver, shaped like a muffle, and placed in a channel through which water flows. A second receiver is connected with that in which the discharge tubes terminate. When the mother-liquor, containing chloride of calcium, is not well separated from the acid phosphate of lime, hydrochloric acid is produced during the distillation, and the amount of phosphorus obtained is proportionately less. The mixture of phosphate of lime and charcoal remaining in the retorts, is incinerated upon iron plates heated by the fire used for distillation, the phosphate of lime mixed with that obtained from the mother-liquor of the acid phosphate, and treated, as above described, with hydrochloric acid, so as to convert it into acid phosphate. The cartilaginous substance is covered with water and heated by steam until the solution is concentrated. By this method fresh bone yields from six to seven per cent. phosphorus, and from ten to twenty per cent. gelatine, while, by the methods formerly adopted, the phosphorus obtained amounted to only four or five per cent.

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[*] *Chem. Gaz.*, No. 326, p. 185. [†] *Neues Repert. für Pharmacie*, iv. 303.
[‡] *Polytechnisches Centralblatt*, 1856, p. 681.

Assay of Galena and Sulphide of Antimony.—M. Levol* recommends the use of ferrocyanide and cyanide of potassium for the reduction of these ores. The best proportions are, for galena, an equal weight of anhydrous ferrocyanide and half its weight of cyanide; for sulphide of antimony, twice its weight of ferrocyanide and half its weight of cyanide. The loss of lead in the assay of galena amounts to only 2.0 or 2.55 per cent. When the ore contains blende, the loss of lead is greater; when it contains sulphide of antimony, this method of assay cannot be adopted, because the regulus would contain antimony. The regulus obtained in the assay of antimony ore, by this method, contains iron to the amount of 3 per cent. Cyanide of potassium alone was not found to effect the complete reduction of the sulphides. The better result obtained by this method of assay is ascribed by M. Levol to the extreme division of the iron resulting from the decomposition of the ferrocyanide, and to the circumstance that the reaction takes place at a low temperature that does not cause much volatilization of the sulphides or metals.

Estimation of Copper.—When the solution, in which copper is to be estimated, does not contain nitric acid, or such metals as antimony or arsenic, that would interfere, Hr. Fleitmann† precipitates copper by means of zinc, separates excess of zinc by digesting with dilute sulphuric acid, washes the copper, if iron were present, with boiled water, then dissolves it by an acid solution of perchloride of iron, and estimates the quantity of iron reduced to the state of protochloride, by means of a solution of permanganate of potash. The quantity of copper is equivalent to half the quantity of iron reduced. When the solution contains nitric acid or metals that would interfere with the precipitation of copper, it is mixed with ammonia in sufficient excess to dissolve the oxide of copper, any precipitate separated by filtration, and the copper precipitated from the ammoniacal liquid, by warming it with zinc shavings, washed, and then dissolved by perchloride of iron, and estimated as above. The advantage of this method consists in the accuracy of the result not being affected by the presence of lead, antimony, or arsenic. When the latter metal is present, it must be converted into arsenic acid, and precipitated from the ammoniacal liquid, by sulphate of magnesia, before the copper is precipitated.

TWENTY-SIXTH MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

Cheltenham, August 6, 1856.

The preliminary business of the Association having been disposed of, the First General Meeting of the Members took place in the evening at eight o'clock. The Duke of Argyle resigned the Chair to Professor Daubeny, who then delivered his address.

The officers for the Chemical Section were, *President*, B. C. Brodie. *Vice-Presidents*, N. S. Maskelyne, W. Gregory, The Master of the Mint, Dr. Miller, Dr. Anderson. *Secretaries*, P. I. Worsley, Prof. Voelcker, J. Horsley. *Committee*, Dr. S. Macadam, Dr. Gladstone, G. Gladstone, W. S. Ward, G. Lowe, Col. Yorke, T. J. Pearsall, Prof. Rowney, C. Brooke, Dr. Gilbert, R. Warrington, W. R. Grove, Dr. Odling, Dr. Schurch, Dr. R. D. Thomson, Prof. J. Tennant.

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* *Annales de Chimie et de Physique*, xlvi., 472.

† *Annalen der Chemie und Pharmacie*, xcviii., 141.

TESTING FOR STRYCHNIA, BRUCIA, &c.

BY MR. JOHN HORSLEY.

I BEG to make a few observations in reference to the poison strychnia, the properties and effects of which have recently been discussed during the celebrated trial of Palmer. In doing this I wish to be understood as confining myself strictly to the chemical manipulation of strychnia.

It is because I have had many opportunities of noticing the very strong affinity which exists between chromic acid and strychnia, that I propose the former for the precipitation of the poison in preference to the alkalies, provided always that the solution to be operated on is more or less pure.

Before proceeding further in this matter, allow me to premise that at your last meeting I presented a paper, detailing a new method of testing iodine, as well as for *manufacturing* it from prepared kelp lyes by *precipitation*, with a certain test liquor. But as it would have been inconvenient for me to have attended the Glasgow meeting, I will here exhibit, with your permission, a sample of iodine thus prepared, as well as the liquor from which it was precipitated, and the test liquor used for that purpose. I may observe that this precipitating liquor is composed of one part of bichromate of potash dissolved in fourteen parts of water, to which is afterwards added two parts in bulk of strong sulphuric acid.

The circumstances connected with Palmer's trial induced me to make a series of experiments, and as I possessed a large quantity of the just-named precipitant, I resolved to try its effect upon a solution of strychnia, which, to my surprise, was *entirely* precipitated in the form of a beautiful golden-coloured and insoluble precipitate.

It will form a beautiful experiment to witness the complete *decolorization* of a solution of either the chromate or bichromate of potash by the gradual addition of a solution of the acetate of strychnia, chromate of strychnia being immediately precipitated; and if the experiment be well conducted, scarcely a trace of bitterness will be left in the supernatant or filtered liquor.

I do not, however, claim as an *original* discovery the use of a chromic salt and an acid liquor, because they have been already suggested by Professor Otto, and have been in use for some time; but the *point* to which I wish to call your attention is the *essential difference* in the mode of their application. In short, such is the extreme range of sensibility which I have attained, that it is no vain assertion on my part in saying that it is just as much out of the power of any human being to define its limits, as it would be for a person to count the sand on the sea-shore, or to measure the drops of the ocean surrounding it; and without an experiment in point, you would not, perhaps, believe it possible.

I will therefore take say thirty drops of this solution of strychnia, containing half a grain. I will dilute it with four drachms of water. I now take this dropping tube, and charging it with a solution of bichromate of potash, I will drop in say six drops. You observe that I have no sooner added *one* drop than crystals begin to form at the bottom; and on the addition of five drops more, and stirring the mixture, the decomposition is complete. I have now split up the half grain of strychnia into *millions* of atoms of minute crystals, each of which, could they be separated, would as effectually demonstrate the chemical characteristics of strychnia as though I had operated on a pound weight of the same. I have now to show you the chemical reaction with those crystals. I will let fall into this evaporating dish a *drop* of the liquor containing the chromate of strychnia, and having shaken the vessel so as to spread out the drop as much as possible, I will project on it from time to time a drop or two of strong sulphuric acid, when the beauty and intensity of the effect will be strikingly apparent. This may even be shown on a still more refined scale, by taking a crystal or two on the point of a penknife, transferring it to the edge of an evaporating dish, and touching the spot with a drop of sulphuric acid.

This chromate of strychnia may be obtained in the amorphous state from the neutral chromate of potash; in the nacreous or irregular crystalline state from the bichromate; and lastly, which forms a more striking peculiarity, in the regular crystalline condition—viz., first in the form of fine spiculæ, and next of beautiful small cubic crystals, which completely stud the sides of the glass vessel when a weak *acid* solution, such as recommended for the precipitation of iodine is used, but of course, considerably diluted. This latter peculiarity is very decided, and characteristic of strychnia.

Experiment: 30 drops of solution of acetate of strychnia, 8 drachms of water; then add 20 drops of the acid solution of bichromate of potash; let it crystallize without shaking.

I have taken some pains to ascertain in what respects other substances may *clash* with this method by producing a more or less similarly coloured salt, and, as far as I have had opportunities of judging, there appear to be only *two*—viz., chromate of brucia and chromate of lead. But I conceive that any Chemist, well acquainted with their specific characters, can *easily distinguish* them from chromate of strychnia.

Both chromate of strychnia and chromate of brucia are very susceptible of *discoloration*—that is, becoming brown or dark-coloured by exposure to sun-light—a property not possessed by chromate of lead.

Chromate of strychnia becomes changed to a deep *purple*, and then to a *violet* and *red* when touched with a glass rod dipped in sulphuric acid. Chromate of brucia, on the contrary, shows only an *orange-red* colour, without any shade of blue or violet. Again, chromate of brucia is so much more soluble than chromate of strychnia, that no *crystals* can be obtained by precipitation with the weak acid liquor previously alluded to.

Chromate of lead never can (except at first sight) be mistaken for either chromate of strychnia or brucia, because, first, it is always in the amorphous or powdery state; and secondly, no colour is developed on the addition of sulphuric acid.

It is therefore evident that the production of chromate of strychnia in one or other form, and its reaction with sulphuric acid, render it a *faultless* and *invaluable* toxicological method, and enable us to pronounce with certainty respecting the alkaloid, since no other comports itself in a similar manner.

In reference to the precipitation of strychnia, it would appear, judging from the very high equivalent of strychnia (348) that a very small quantity of the chromic salt is necessary for that purpose, as may be verified by experiment. Every three-and-a-half out of four parts of chromate of strychnia may be said to be the proportion of real strychnia.*

It has been asserted since the trial, that the non-detection of strychnia in the body of John Parsons Cook, was owing to the antimony which was known to have been taken by the deceased having somewhat interfered with the tests. Such a supposition is, in my opinion, truly absurd. Nothing, I conceive, can more incontestably disprove this fallacy, than either of the following additional new tests for the detection of strychnia.

If we mix one part of a saturated solution of the yellow cyanide of potassium (containing twelve grains to each drachm of water) with two parts of a solution of the acetate of strychnia, or if we take say thirty drops of the solution of strychnia diluted with sixty or ninety drops of water, and then drop in *one* minim only of the solution of the ferrocyanide of potassium, and agitate the mixture for a few seconds, an abundance of minute yellowish-white silky crystals of the ferrocyanide of strychnia is formed. This is a very beautiful compound test, and is best shown as follows:—I first take a very small portion of powdered protosulphate of iron, and laying upon it a little of the dried ferrocyanide of strychnia, drench them both with a drop of water—the characteristic deep blue of the iron is first developed. This must now be *dis*colored by one or two drops of strong sulphuric acid, and next a minute portion of powdered chromate of potash stirred in—the usual purple and violet colour of strychnia will then readily appear. The same effect is produced with the red prussiate of potash.

The next test is the decolorization of a solution, the ammonia sulphate of copper, by the very gradual addition of a solution of strychnia, and then boiling the mixture. Crystals of strychniate of copper with a little ammonia will be obtained. These, when dry, can be first decolorized by sulphuric acid, the subsequent addition of chromate of potash *ground in with the aid of a glass rod*, will reveal the presence of strychnia.

In fact, these tests, particularly that with chromate of strychnia, may be considered *double* tests, because we have first the obtainment of a peculiar crystalline compound of strychnia, which is afterwards made to develop the characteristic effects by which strychnia is recognized.

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* It may be a point for consideration how far chromate of potash in solution may be useful in neutralizing the effect of any of the free strychnia existing in the stomach.

The Laboratory, Cheltenham, July 5, 1856.

ON A NEW METHOD OF EXTRACTING THE ALKALOIDS STRYCHNIA AND BRUCIA FROM NUX VOMICA WITHOUT ALCOHOL.

BY MR. JOHN HORSLEY.

The usual modes of obtaining strychnia from nux vomica are, besides being more or less expensive owing to the alcohol used, far from satisfactory. This, in a toxicological point of view, is particularly the case, on account of the small quantity of strychnia naturally contained in the nut, and as the production of the alkaloid for its characteristic colour test is a matter of importance, I have been induced to make several experiments on the different methods in use, and it appears to me that the simplest and best is that which I now propose, viz., to make an acetic extract by kneading up, say a quarter of a pound of nux vomica with an equal quantity of commercial acetic acid, and thinning the pulpy mass with two or three pints of cold water, allowing it to digest for a few days. The clear liquor must then be decanted off and an equal quantity of fresh water poured on the mass to digest for a day or two longer, or till all soluble matter is extracted. The clear liquor is then to be decanted, and the remainder thrown on a flannel filter. The liquid which passes through should be mixed with the former decanted liquors and evaporated to a syrupy consistence (about three or four ounces). When this is cold dilute it with an equal quantity of water, add liquor ammoniæ in excess, and set it by for a day or two that the strychnia may crystallize out, which is known by the various little white tufts which collect within the fluid as well as on the sides of the glass vessel. When the crystallization is complete, the dark green supernatant fluid is to be passed through a calico filter, and the residuum with the crystals adhering to the vessel collected thereon to drain, the dark green mass consisting of strychnia and brucia with resinoid matter is next to be scraped off and well dried in a water-bath, digested in hot diluted acetic acid and the solution filtered. The strychnia and brucia may be thrown down by potassa, or the strychnia *only* by the addition of a solution of chromate of potassa, when a chromate of strychnia will be obtained free from brucia provided the solution be tolerably acid which retains the brucia.

This chromate of strychnia being collected on a filter and well drained, can easily be *de*chromatized by digestion in liq. ammoniæ, and the strychnia obtained of a more or less *snowy whiteness.*

The quantity of strychnia actually contained in the nux vomica has not, I believe, been accurately ascertained, at least if I may judge from Professor Taylor's work on poisons, where that gentleman represents it at about $\frac{5}{10}$ or $\frac{1}{2}$ a grain per cent. I cannot help thinking that the exhaustion in that case must have been but imperfectly performed, as my own experiments show that nearly twice that quantity is capable of being extracted; for in my first concentration of the liquor from a quarter of a pound of nux vomica I obtained as follows:—

From the 1st concentration 11 grains of strychnia
" 2nd " 4 " "
" 3rd " 2 " "
—
17 grains

This difference in quantity is necessary to be borne in mind by the medical practitioner when prescribing the extract and other preparations of nux vomica.

The Laboratory, Cheltenham, July 14th, 1856.

EXPERIMENTS ON ANIMALS WITH STRYCHNIA, AND THE PROBABLE REASONS FOR ITS NON-DETECTION IN CERTAIN CASES.

[The following is the paper read in Section B. by Mr. John Horsley, of Cheltenham, on the above subject.]

In a previous paper I have detailed a method of detecting infinitesimal quantities of strychnia; but of what avail, may it not be asked, are all your fine tests, if, when an animal has been purposely poisoned with strychnia, little or none of it can be extracted or discovered? That this is sometimes the case, the following experiments will show. I am aware that an opinion prevails amongst some chemists that strychnia is indestructible, indecomposable, and that it ought always to be found in the different organs. In a future part of this paper I shall allude to the *probable* reasons for the *non-detection* of strychnia in certain cases.

Wishing to make some experiments on animals, I purchased (for I could obtain no other) three fine white rats, and invited my friend Dr. Wright to be present. At 7.20 P.M. we gave a quarter of a grain of powdered strychnia by way of the mouth, projecting it from paper, and washing it down with a little water.

In about twelve minutes the first signs of involuntary twitchings of the muscles were observed, but they were of a *slight* character, and continued occasionally during long intervals. After an hour had elapsed, finding the strychnia had not produced much effect, it was suggested by Dr. Wright that the largest rat (which was a female) should have another dose of a quarter of a grain, which was administered. This also not producing any marked effect at half-past nine o'clock, a half-grain more was given to this same animal, leaving the others to see what effect the quarter of a grain would have on them in course of time.

At eleven o'clock I retired to rest, after placing a saucer of bread and milk in the box with the rats. At a quarter to 4 A.M. I got up for the purpose of seeing how the rats were, and found them still alive and apparently healthy, having partaken plentifully of bread and milk.

At 7 A.M., when the assistant came down, he found two of the rats (one that had a quarter of a grain and the other which had one grain) had recently died, as their bodies were quite warm, and, in about twenty minutes afterwards, the remaining rat died. This animal had lived just twelve hours after having had a quarter of a grain of strychnia administered.

In about three hours afterwards I proceeded to open the rat which had died last, and examined every part of the body with a view to detect the poison, commencing with the heart, but in no instance could the poison be found.

I will now state the mode of procedure I adopted, in order that you may judge whether or not the treatment was proper.

The different organs were triturated in a mortar with water, to which alcohol and acetic acid were afterwards added, the whole allowed to digest for a while, and then *boiled*. After being strained and filtered, the liquor was evaporated to dryness by a water-bath—the extract re-dissolved with alcohol and acetic acid, and filtered. This liquor was again evaporated, and similarly treated with fresh alcohol, &c. Lastly, the extract was dissolved in water, and the acid carefully neutralized with caustic potash; the resulting precipitate did not, however, on being treated with sulphuric acid and bichromate of potash, afford the least indication of strychnia; but in order to show that it could not have been present, or, if present, that the organic matter did not interfere or prevent any reaction, I purposely introduced a little strychnia, which instantly developed the usual purple and violet colours. This testing and *counter*-testing proved unquestionably the absence of strychnia in the precipitate. There was, moreover, a total absence of *bitterness* in all the liquors.

In this way I proceeded step by step with every part of the bodies, but could not get any reaction by the tests I used to detect the poison. What, then, became of the strychnia? Has it been decomposed in the organism and its nature changed, as Baron Liebig intimates when writing in general on the alkaloids?

Now, in reference to the non-detection of strychnine, I do not positively assert that such is the case, but I think it not improbable that the strychnia may have become imbibed into the albumen or other solid animal matter, and so abstracted from the fluid, forming by coagulation (say, for instance, in the blood) a more or less insoluble albuminate. The idea has occurred to me from noticing the coagulation of the glairy white of egg with strychnia, and the fact of my not recovering the full quantity of the alkaloid whenever I had introduced it. At any rate it merits consideration.

EXPERIMENT II.—At three o'clock in the afternoon, I administered to a *wild* rat at least three-quarters of a grain of strychnia. It apparently evinced but very little of the effects of the poison, and, after being kept alive for five days, was only purposely killed by a dog, partly because of the cage being required by the person who lent it to me, and partly from the fact of the animal, which in other respects was very well, having œdematous swellings of the palms of the feet, and one of its fore feet contracted.

EXPERIMENT III.—I administered two grains of strychnia, in the form of a pill, made with conserve of roses, to a full-sized terrier, taking the precaution against its rejection, on account of its bitter taste, to wrap it up in *a fold of blotting paper*. The dog was dosed at 6 P.M. and taken out into the outer laboratory to die. I visited him regularly every half hour for five hours, until I went to bed, and the dog, as far as I could observe, had not evinced a single symptom. In the morning, however, it was dead, but lying apparently in the most natural position for a dog asleep, with its head resting on its shoulder and its feet stretched out. When taken up, blood flowed freely from its mouth. On opening the animal, I found the right ventricle of the heart empty of blood, whilst the left was full, some of the blood being liquid and some clotted. The stomach was carefully secured at both its orifices and detached. On making an incision I was surprised at not seeing the paper in which I had wrapped the pill—naturally expecting it would have been reduced to a pulp by the fluids of the stomach. I therefore sought for it, and lo! here it is, in precisely the same condition as when first introduced into the gullet of the dog, and containing nearly all the strychnia. I have been afraid to disturb it until I had exhibited it to you; and now I will weigh the contents, and ascertain how much has been absorbed or dissolved out, or treat it in whatever way you like.* This experiment is important, as showing the small quantity of strychnia necessary to destroy life, and had I not been thus particular to search for the paper envelope, it might possibly have led to a fallacy, as I must have used an acid, and that would have dissolved out the strychnia, and the inference would have been that it was obtained from the contents of the stomach, whereas it had never been diffused.

In this case, also, none of the *absorbed* strychnia was detectable in the blood or any part of the animal, although the greatest care was observed in making the experiments. In some cases the precipitates were digested in ether, at other times in chloroform, but without yielding any indications of strychnia. *Slight* traces were, however, observable in the contents of the stomach.

The Laboratory, Cheltenham, July 24th, 1856. JOHN HORSLEY.

Since writing the foregoing, I have made some experiments which I think will prove that it is highly probable a more or less insoluble compound of organic or animal matter with strychnia is formed.

For instance, I took the contents of an egg (the white and the yolk), agitated them with a solution of strychnia containing one and a half grains of strychnia, and boiled them to complete coagulation in a water-bath. I next broke up the coagulum, and tried to extract the strychnia by boiling it with water. The filtered liquor, which was slightly bitter, was evaporated to dryness, boiled with alcohol and a few drops of acetic acid, and again evaporated to dryness. This extract was treated with water, acidulated with acetic acid, filtered, and carefully neutralized with liquor potassæ; on standing for a short time, small needle-shaped crystals of strychnia were deposited, but in small proportion, perhaps not more than one-sixth of the original quantity used. I next digested the solid residue of the egg in strong sulphuric acid, diluted it with water, and then boiled the mixture; the liquor, though strongly acid, left no bitterness on the palate. After filtration, and pressing the residue in a cloth, the liquor was concentrated by evaporation, and neutralized with ammonia, but only a precipitate of organic matter was obtained, for when this was collected in a phial and washed with ether, hardly a trace of strychnia could be detected on treating that which remained after evaporating the ether. This, I think, proves that the strychnia must either have been destroyed by combination with the solid organic matter, so as to render it incapable of being extracted as pure strychnia, or else decomposed by the sulphuric acid in the attempt to extract it from the albuminoid matter.

A NEW METHOD OF INSTITUTING POST-MORTEM RESEARCHES FOR STRYCHNIA.

BY JOHN HORSLEY.

THE following will be found an exceedingly simple and successful method of obtaining strychnia, in cases where it is practicable, from the tissues of the body.

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* I have since ascertained that it took three-quarters of a grain to kill the dog.

I have already hinted at the probable reasons why we are sometimes unable to detect strychnia in animals known to have been thus poisoned, therefore it is unnecessary for me to repeat it.

The weather at the time of making these experiments being very hot, the effluvia evolved from so much putrefying animal matter, induced me to adopt some means for remedying such annoyance. I therefore thought of a solution of ordinary chloride of lime (bleaching liquid), but fearing lest that agent should decompose or destroy the strychnia, I first tried its effect on a weak acetic solution of strychnia, and was surprised to find that a milky white precipitate of a chloride, possibly a hypochlorite of strychnia, ensued, insoluble even on the addition of a large quantity of acetic acid. This precipitate, when drained on a filter and dried, is freely soluble in alcohol, which seems to be its best spirituous solvent, but did not readily dissolve in dilute sulphuric acid, except with the aid of heat. Its best acid solvent is glacial acetic acid.

This result gave me such confidence, that I at once proceeded to operate on animal matter. I therefore took some of the putrid liquid in which the liver of a dog poisoned by strychnia had been boiled, which liver, I should tell you, had not hitherto yielded me any strychnia. I purposely introduced a little of the alkaloid, boiled them a few minutes, and when cold, added the liquid chloride of lime in excess, or till all soluble matter (animal or otherwise) was precipitated, and then filtered it through a cloth. No trace of bitterness could then be detected in the liquor.

The drained precipitate of fibrine, gelatine, casein, and strychnia was next dried in a water-bath, then powdered, digested in alcohol acidified with a little dilute sulphuric acid, heated, filtered, and evaporated to the consistency of a syrup, by this time the whole of the smell of chlorine will have been given off and a sulphate of strychnia obtained, which can be purified in the usual way, by precipitation with an alkali, &c.

The Laboratory, Cheltenham, August 1*st*, 1856.

ON THE MANUFACTURE OF IRON AND STEEL WITHOUT FUEL.

BY MR. W. BESSAMER.

Mr. Bessamer asserted that crude iron contains about 10 per cent. of carbon; that carbon cannot exist at a white heat in the presence of oxygen without uniting therewith and producing combustion; that such combustion would proceed with a rapidity dependent on the amount of surface of carbon exposed; lastly, that the temperature which the metal would acquire would be also dependent on the rapidity with which the oxygen and carbon were made to combine, and consequently that it was only necessary to bring the oxygen and carbon together in such a manner that a vast surface should be exposed to their mutual action in order to produce a temperature hitherto unattainable in our largest furnaces. With a view of testing practically this theory, he had constructed a cylindrical vessel of three feet in height, somewhat like an ordinary cupola furnace, the interior of which was lined with fire-bricks; and at about two inches from the bottom of it inserted five tuyere pipes, the nozzles of which were framed of well-burnt fire-clay, the orifice of each tuyere pipe being about three-eighths of an inch in diameter. These were so put into the brick lining (from the outer side) as to admit of their removal and renewal in a few minutes when they were worn out. At one side of the vessel, about half-way up from the bottom, there was a hole made for running in the crude metal, and on the opposite side there was a tap-hole stopped with loam, by means of which the iron was run out at the end of the process. The vessel should be placed so near to the discharge hole of the blast-furnace as to allow the iron to flow along a gutter into it. A small blast cylinder would be required, capable of compressing air to about 8 lb. or 10 lb. to the square inch. A communication have been made between it and the tuyeres before named, the converting vessel would be in a condition to commence work. It would, however, on the occasion of its being first used after re-lining with fire-bricks, be necessary to make a fire in the interior with a few baskets of coke, so as to dry the brickwork and heat up the vessel for the first operation, after which the fire would have to be all carefully raked out at the tapping-hole, which would again be made good with loam. The vessel would then be in readiness to commence work, and might be so continued without any use of fuel, until the brick lining in the course of time became worn away and a new lining was required. The tuyeres are situated nearly close to the bottom of the vessel; the fluid metal will therefore rise some eighteen inches or two feet above them. It is necessary, in order to prevent the metal from entering the tuyere-holes, to turn on the blast before allowing the fluid crude iron to run into the vessel from the blast-furnace. This having been done, and the fluid iron run in, a rapid boiling up of the metal will be heard going on within the vessel, the metal being tossed violently about, and dashed from side to side, shaking the vessel by the force with which it moves from the throat of the converting vessel. Flame will then immediately issue, accompanied by a few bright sparks; this state of things will continue for about fifteen or twenty minutes, during which time the oxygen in the atmospheric air combines with the carbon contained in the iron, producing carbonic acid gas, and at the same time evolving a powerful heat. Now, as this heat is generated in the interior of, and is diffused in innumerable fiery bubbles through the whole fluid mass, the metal absorbs the greater part of it, and its temperature becomes immensely increased; and by the expiration of the fifteen or twenty minutes before named, that part of the carbon which appears mechanically mixed and diffused through the crude iron has been entirely consumed. The temperature, however, is so high that the chemically-combined carbon now begins to separate from the metal, as is at once indicated by an immense increase in the volume of flame rushing out of the throat of the vessel. The metal in the vessel now rises several inches above its natural level, and a light frothy slag makes its appearance, and is thrown out in large foam-like masses. This violent eruption of cinder generally lasts five or six minutes, when all further appearance of it ceases—a steady and powerful flame replacing the shower of sparks and cinder which always accompanies the boil. The rapid union of carbon and oxygen which thus takes place adds still further to the temperature of the metal, while the diminished quantity of carbon present, allows a part of the oxygen to combine with the iron, which undergoes combustion, and is converted into an oxide. At the excessive temperature that the metal has now acquired, the oxide, as soon as formed, undergoes fusion, and forms a powerful solvent of those earthy bases that are associated with the iron. The violent ebullition which is going on mixes most intimately with scoriæ and metal, every part of which is thus brought into contact with the fluid, which will thus wash and cleanse the metal most thoroughly from the silica and other earthy bases which are combined with the crude iron, while the sulphur and other volatile matters which cling so tenaciously to iron at ordinary temperatures are drawn off, the sulphur combining with the oxygen, and forming sulphurous acid gas. The loss in weight of crude iron during its conversion into an ingot of malleable iron, was found, on a mean of four experiments, to be 12½ per cent., to which will have to be added the loss of metal in the finishing rolls. This will make the entire loss probably not less than 18 per cent., instead of about 28 per cent., which is the loss on the present system. A large portion of this metal is, however, recoverable, by treating with carbonaceous gases the rich oxides thrown out of the furnace during the boil. These slags are found to contain innumerable small grains of metallic iron, which are mechanically held in suspension in the slags, and may be easily recovered, by opening the tap-hole of the converting vessel, and allowing the fluid malleable iron to flow into the iron ingot moulds placed there to receive it. The masses of iron thus formed will be perfectly free from any admixture of cinder, oxide, or other extraneous matters, and will be far more pure and in a sounder state of manufacture than a pile formed of ordinary puddle bars. And thus it will be seen, that by a single process, requiring no manipulation or particular skill, and with only one workman, from three to five tons of crude iron passes into the condition of several piles of malleable iron in from thirty to thirty-five minutes, with the expenditure of about one-third part the blast now used in a fiery furnace with an equal charge of iron, and with the consumption of no other fuel than is contained in the crude iron. To persons conversant with the manufacture of iron (said Mr. Bessamer), it will be at once apparent that the ingots of malleable metal which I have described will have no hard or steely parts, such as are found in puddled iron, requiring a great amount of rolling to blend them with the general mass; nor will such ingots require an excess of rolling to expel cinder from the interior of the mass, since none can exist in the ingot, which is pure and perfectly homogeneous throughout, and hence requires only as much rolling as is necessary for the development of fibre; it therefore follows that, instead of forming a merchant bar or rail by the union of a number of separate pieces welded together, it will be far more simple and less expensive to make several bars or rails from a single ingot. Doubtless this would have been done long ago had not the whole process been limited by the size of the ball which the puddler could make. I wish to call the attention of the meeting to some of the peculiarities which distinguish cast steel from all other forms of iron—namely, the perfect homogeneous character of the metal, the entire absence of sand-cracks or flaws, and its greater cohesive force and elasticity, as compared with the blister steel from which it is made—qualities which it derives solely from its fusion and formation into ingots, all of which properties malleable iron acquires in a like manner by its fusion and formation into ingots in the new process; nor must it be forgotten that no amount of rolling will give to blister steel (although formed of rolled bars) the same homogeneous character that cast steel acquires by a mere extension of the ingot to some ten or twelve times its original length. One of the most important facts connected with the new system of manufacturing malleable iron is that all the iron so produced will be of that quality known as charcoal iron; not that any charcoal is used in its manufacture, but because the whole of the processes following the smelting of it are conducted entirely without contact with, or the use of, any mineral fuel; the iron resulting therefrom will in consequence be perfectly free from those injurious properties which that description of fuel never fails to impart to iron that is brought under its influence. At the same time this system of manufacturing malleable iron offers extraordinary facility for making large shafts, cranks, and other heavy masses. It will be obvious that any weight of metal that can be founded in ordinary cast iron by the means at present at our disposal may also be founded in molten malleable iron, to be wrought into the forms and shapes required, provided that we increase the size and power of our machinery to the extent necessary to deal with such large masses of metal. A few minutes' reflection will show the great anomaly presented by the scale on which the consecutive processes of iron making are at present carried on. The little furnaces originally used for smelting ore have been from time to time increased in size until they have assumed colossal proportions, and are made to operate on two or three hundred tons of materials at a time, giving out ten tons of fluid metal at a single run. The manufacturer has thus gone on increasing the size of his smelting furnaces, and adapting to their use the blast apparatus of the requisite proportions, and has by this means lessened the cost of production in every way. His large furnaces require a great deal less labour to produce a given weight of iron than would have been required to produce it with a dozen furnaces; and in like manner he diminishes his cost of fuel, blast, and repairs, while he ensures a uniformity in the result that never could have been arrived at by the use of a multiplicity of small furnaces. While the manufacturer has shown himself fully alive to these advantages, he has still been under the necessity of leaving the succeeding operations to be carried out on a scale wholly at variance with the principles he has found so advantageous in the smelting department. It is true that hitherto no better method was known than the puddling process, in which from 400 lb. to 500 lb. weight of iron is all that can be operated upon at a time; and even this small quantity is divided into homœopathic doses of some 70 lb. or 80 lb., each of which is moulded and fashioned by human labour, and carefully watched and tended in the furnace, and removed therefrom one at a time, to be carefully manipulated and squeezed into form. When we consider the vast extent of the manufacture, and the gigantic scale on which the early stages of the process is conducted, it is astonishing that no effort should have been made to raise the after-processes somewhat nearer to a level commensurate with the preceding ones, and thus rescue the trade from the trammels which have so long surrounded it. Before concluding these remarks, I beg to call your attention to an important fact connected with the new process, which affords peculiar facilities for the manufacture of cast steel. At that stage of the process immediately following the boil, the whole of the crude iron has passed into the condition of cast steel of ordinary quality. By the continuation of the process the steel so produced gradually loses its small remaining portion of carbon, and passes successively from hard to soft steel, and from soft steel to steely iron, and eventually to very soft iron; hence, at a certain period of the process any quality of metal may be obtained. There is one in particular, which, by way of distinction, I call semi-steel, being in hardness about midway between ordinary cast steel and soft malleable iron. This metal possesses the advantage of much greater tensile strength than soft iron. It is also more elastic, and does not readily take a permanent set, while it is much harder, and is not worn or indented so easily as soft iron. At the same time it is not so brittle or hard to work as ordinary cast steel. These qualities render it eminently well adapted to purposes where lightness and strength are especially required, or where there is much wear, as in the case of railway cars, which from their softness of texture soon become destroyed. The cost of semi-steel will be a fraction less than iron, because the loss of metal that takes place by oxidation in the converting vessel is about two-and-a-half per cent. less than it is with iron; but as it is a little more difficult to roll, its cost per ton may be fairly considered to be the same as iron. But as its tensile strength is some thirty or forty per cent. greater than bar iron, it follows that for most purposes a much less weight of metal may be used; so that taken in that way the semi-steel will form a much cheaper metal than any that we are at present acquainted with. The facts which I have brought before the meeting are not mere laboratory experiments, but the result of working on a scale nearly twice as great as is pursued in our largest ironworks—the experimental apparatus doing 7 cwt. in thirty minutes, while the ordinary puddling furnace makes only 4½ cwt. in two hours, which is made into six separate balls, while the ingots or blooms are smooth, even prisms, ten inches square by thirty inches in length, weighing about equal to ten ordinary puddle balls.

REPORT OF THE SELECT COMMITTEE OF THE HOUSE OF COMMONS ON THE ADULTERATION OF FOOD, DRINKS, DRUGS, &c.

THE SELECT COMMITTEE appointed to inquire into the ADULTERATION of FOOD, DRINKS, and DRUGS, and who were empowered to Report their Observations, together with the MINUTES OF EVIDENCE, from time to time to the House, HAVE made further progress in the matters to them referred, and have agreed to this their final REPORT:—

YOUR Committee have inquired into the subject referred to them, and in the course of their investigation have examined a great number of witnesses, comprising men of high scientific attainments, as well as those whose practical knowledge as dealers seemed to point them out as persons likely to give useful information.

Among the scientific witnesses examined, were: Dr. Hassall, well known by his able investigations of the subject of the adulterations of food; Mr. Warington, chemical operator to the Apothecaries' Company; Dr. Normandy; Mr. Simon and Dr. Letheby, the late and present officers of health in the city of London; Dr. Thompson, professor of chemistry at St. Thomas's Hospital; Mr. Redwood, professor of chemistry to the Pharmaceutical Society; Mr. Simmonds, author of a work on the commercial products of the vegetable kingdom; Mr. Postgate, a surgeon, and chemical lecturer in Birmingham; Mr. Phillips, chief officer of the chemical department of the Board of Inland Revenue; Dr. Taylor, professor of medical jurisprudence at Guy's Hospital; Dr. Waller Lewis, medical officer to the General Post Office; Mr. Quekett, professor in the Royal College of Surgeons; Mr. Thompson, an analytical chemist; Mr. Blyth, lecturer on natural philosophy at St. Mary's Hospital; Dr. Challice; Mr. Wakley, coroner for Middlesex; Mr. Jacob Bell; Dr. Carpenter, of University College; Dr. Moore Neligan, of Dublin; Dr. Richter; and Dr. Bingley, professor at the Medical Institute of Sheffield.

Though the witnesses differed both as to the extent to which adulteration is carried on and as to its nature and effects, your Committee cannot avoid the conclusion that adulteration widely prevails, though under circumstances of very various character. As regards foreign products, some arrive in this country in an adulterated condition, while others are adulterated by the English dealer. Other commodities, again, the produce of this country, are shown to be in an adulterated state when passing into the hands of the dealers, while others undergo adulteration by the dealers themselves.

Not only is the public health thus exposed to danger, and pecuniary fraud committed on the whole community, but the public morality is tainted, and the high commercial character of this country seriously lowered both at home and in the eyes of foreign countries. Though, happily, very many refuse, under every temptation, to falsify the quality of their wares, there are, unfortunately large numbers, who, though reluctantly practising deception, yield to the pernicious contagion of example, or to the hard pressure of competition forced upon them by their less scrupulous neighbours.

Without entering into voluminous details of the evidence taken, your Committee would enumerate the leading articles which have been proved to be more or less commonly adulterated; these are, arrow-root, adulterated with potato and other starches; bread, with potatoes, plaster of Paris, alum, and sulphate of copper; bottled fruits and vegetables with certain salts of copper; coffee with chicory, roasted wheat, beans, and mangel-worzel; chicory with roasted wheat, carrots, sawdust, and Venetian red; cocoa, with arrowroot, potato-flour, sugar, chicory, and some ferruginous red earths; cayenne with ground rice, mustard husk, &c., coloured with red lead, Venetian red, and turmeric ; gin with grains of Paradise, sulphuric acid, and cayenne; lard with potato-flour, mutton suet, alum, carbonate of soda, and caustic lime; mustard with wheat flour and turmeric; marmalade with apples or turnips; porter and stout (though sent out in a pure state from the brewers) with water, sugar, treacle, salt, alum, cocculus Indicus, grains of Paradise, nux vomica, and sulphuric acid; pickles and preserves with salts of copper; snuff with various chromates, red lead, lime, and powdered glass; tobacco with water, sugar, rhubarb, and treacle; vinegar with water, sugar, and sulphuric acid; jalap with powdered wood ; opium with poppy capsules, wheat-flour, powdered wood, and sand ; scammony with wheat-flour, chalk, resin, and sand ; confectionery with plaster of Paris and other similar ingredients, coloured with various pigments of a highly poisonous nature; and acid drops purporting to be compounded of jargonelle pear, ribstone pippin, lemon, &c., with essential oils containing prussic acid or other dangerous ingredients.

The adulteration of drugs is extensively practised, and when it is borne in mind that the correctness of a medical prescription rests on an assumed standard of strength and purity in the drugs or compounds employed, and how frequently life itself depends upon the efficacy of the medicines prescribed, it is difficult to exaggerate the evils arising from this prevalent fraud.

The adulteration of drinks deserves also special notice, because your Committee cannot but conclude that the intoxication so deplorably prevalent is in many cases less due to the natural properties of the drinks themselves, than to the admixture of narcotics or other noxious substances intended to supply the properties lost by dilution.

Though adulterations prevail more or less in all districts, it may be assumed as a rule, that the poorer the district, the greater is the amount of adulteration. Nor have the poor the same power to protect themselves against such frauds as their richer neighbours; they are necessarily limited to such means of purchase as are afforded by the immediate locality in which they reside, and are, moreover, too often bound to one dealer by the facilities of credit which he affords them.

These adulterations may be classified under three heads : those of which the object is to lower the price of the article adulterated by the admixture of substances of a cheaper kind ; those which are intended to improve the appearance of the adulterated article, and thus in many cases to deceive the public as to its quality; and those which are practised for the purpose of simulating some property injured or destroyed in the process of adulteration.

Adulterations in each of these classes are of two kinds: those in which are employed substances of an innocuous character, and those in which the mixtures are more or less injurious to health, either directly by the noxious properties of the ingredients, or indirectly by lowering the nutritive qualities of the article adulterated.

In dealing with these various adulterations, it is necessary to distinguish between the pecuniary fraud practised on the public, and the injury to public health. If, as regards the adulteration of articles with substances of a cheaper and innocuous character, the public derive the full benefit of this cheapness at a lower price, it would be difficult, if not unwise, for the Legislature to interfere, unless it could do so by requiring that every such article be sold as a mixture, as distinguished from the article in its pure state. This the law already requires as to the article of coffee, and also as to the article of bread, which, unless made of wheat flour alone, must be distinctly marked with the letter M. But, whenever an article is so adulterated as to involve pecuniary fraud or injury to health, it appears to your Committee to be the duty of the Legislature to provide some efficient remedy.

It has been objected that the best course will be to leave the buyer to take care of himself. But there are many adulterations which it is impossible for the buyer to detect. Already the law takes note of frauds in weights and measures, of injuries likely to result to the public health from the sale of unwholesome animal food, and indeed of many adulterations, though in most cases only with a view to fiscal considerations, and not to those of a moral or sanitary character.

It is said, too, that there are many frauds which legislation cannot reach or punish. But, on the other hand, it would be difficult to tell the numberless frauds which legislation may prevent.

The great difficulty of legislating on this subject lies in putting an end to the liberty of fraud without affecting the freedom of commerce.

With a view to form an opinion as to the best remedy for this growing evil, your Committee have obtained evidence as to the law on adulterations in other countries, and especially in France, Belgium, Germany, and the United States. In this object your Committee have been materially assisted by returns procured through the kindness of Lord Clarendon from some of our Ministers at foreign Courts.

As to the present state of the law in this country, your Committee received much valuable information from Mr. S. R. Goodman, the legal adviser to the Justices of the city of London.

The following is a brief statement of the laws of different countries on the subject of adulterations.

In France, a law, bearing date the 27th March, 1851, confirmed and extended the penal code to all adulterations in "alimentary and medicinal substances." To this law was added one of the 5th May, 1855, applicable to the adulteration of drinks. The law of March, 1851, was founded upon two Reports of a Commission of Inquiry, bearing date the 24th January and 25th February, 1851. The law of May, 1855, was preceded by a like Report, made the 29th March, 1855.

The provisions of these laws apply: 1st. To those who shall adulterate any alimentary or medicinal substances intended for sale.

2nd. To those who shall sell, or expose for sale such substances, knowing them to be adulterated.

If the article adulterated contains substances injurious to health, the fine ranges from 50 to 500 francs, with imprisonment from three months to two years; these punishments being applicable even in cases where the adulteration is known to the buyer or consumer.

A penalty of 16 to 25 francs, and imprisonment from six to ten days, or one of these modes of punishment, according to circumstances, is imposed on those who, "without legitimate cause," shall have in their shops or warehouses any such adulterated articles. If the adulterated article be injurious to health, the fine may be increased to 50 francs, and the imprisonment to 15 days.

The fine and imprisonment may be doubled if a delinquent has been previously convicted within five years of his last offence.

The adulterated articles shall be confiscated, and if injurious to health, destroyed.

The authorities may make public announcement of the particulars of the offence by placard and advertisement.

A special "Ordonnance de Police," in Paris, applies to the manufacture and sale of confectionery, and forbids the use, for colouring, of all mineral matter, and all poisonous vegetable matter. Confectioners are required to envelope coloured confectionery in paper marked with their name and address, and are made personally responsible for accidents arising from the consumption of the articles they sell. Confectioners' shops are to be visited, for the purpose of seeing that they conform to these regulations. As an additional precaution, the "Conseil de Salubrité" of the city of Paris, a body consisting of eminent physicians, chemists, and other persons, publishes a list of colouring matters which may be employed by confectioners, with instructions as to the manner of mixing them, and a list of the colouring matters, the use of which is expressly forbidden.

In Belgium, a law, bearing date the 17th March, 1856, declares that all who shall have adulterated, or caused to be adulterated, any articles of food or drink intended for sale, shall be liable to an imprisonment from eight days to one year, and a fine of from 50 to 1000 francs, or to either punishment alone.

The penalties are divided into two classes. The first applies to persons who have adulterated, or caused to be adulterated, eatables, drinkable liquors, or any articles of food intended to be offered for sale, the penalty being, as already stated, from eight days to a year's imprisonment, and a fine of from 50 to 1000 francs. In the same class are included persons who shall knowingly sell, or expose for sale, adulterated articles, or shall have given instructions calculated to facilitate or lead to such adulteration.

The second class comprises persons who unintentionally sell, or expose for sale, adulterated food, and who are liable only to simple police punishments.

The mere fact of knowingly keeping adulterated articles of food intended for sale, renders the person so offending liable to imprisonment from a week to a year, and to a fine of from 26 to 500 francs. When the punishment reaches six months' imprisonment, the court can withdraw the "patente" (license to trade) from the offender during the whole period of his incarceration, which is equivalent to preventing him from carrying on his business. A copy of the conviction is to be posted up at the door of the person condemned, or inserted in such journals as the Court may determine, at the expense of the culprit. All adulterated articles of food in the possession of the delinquent are to be confiscated.

In Prussia, the municipal law enacts that "no person shall knowingly sell or communicate to other persons for their use articles of food or drink which possess properties prejudicial to health, under a penalty of fine or bodily punishment." Those who are found guilty of knowingly selling victuals which are damaged or spoiled, or mixed with deleterious additions, may be held incapable of carrying on the same branch of business. The articles may be confiscated. Whosoever mixes articles of food with foreign substances, for the purpose of increasing their weight or bulk, or of deceiving purchasers as to their quality, is liable to be proceeded against for fraud. With regard to drugs, the law forbids their being dispensed by any other persons than apothecaries legally appointed.

In Hamburg, adulterations of food are the subject of police regulations, involving fine and imprisonment.

In Lubeck, such adulterations are treated as acts of fraud, and dealt with by police authority. The grinding of blighted corn with good corn is prohibited.

In Holland, by a law of the 22nd May, 1829, any person adulterating bread or flour, or any article of food or drink, with any poisonous matter, is liable to an imprisonment of from two to five years, and a fine of from two hundred to five hundred florins, and to the revocation of his "patente" during his imprisonment. The same penalties apply to those who knowingly sell such adulterated articles, and to those who supply the forbidden ingredient, knowing the purpose for which it is to be used. A less severe punishment is inflicted on those who adulterate articles of food or drink with ingredients not poisonous, but injurious to health, as well as on those who offer them for sale. To the other penalties are added the publication of the names of the offenders, and the confiscation of the adulterated goods.

In Spain, the law, besides authorizing the inspection of drugs at the Custom-house, permits the dispensing of drugs only by apothecaries legally appointed, and absolutely forbids the sale of secret medicines.

In the United States, special laws have been passed "to prevent the importation of adulterated and spurious drugs and medicines." By these it is enacted that all drugs and medicines shall, before passing the custom-house, be examined and appraised, as well in reference to their quality and purity as to their value. All medicinal preparations are to have the name of the manufacturer affixed to each parcel. Adulterated or deteriorated drugs and medicines are not to be allowed to pass the custom-house; but the owner or consignee has the right of calling for a re-examination or further analysis, if dissatisfied with the examiner's return. The Secretary of the Treasury is to appoint suitably qualified persons, at each of the ports of New York, Boston, Philadelphia, Baltimore, Charleston, and New Orleans, as special examiners of drugs and medicines. A Treasury Minute prescribes the manner of carrying out the Act, and gives a list of the principal articles, with the result of special tests agreeing with the standards referred to in the law; and all articles are entitled to entry when ascertained by analysis to conform to those standards. Patent and secret medicines are subject to the same examination, and disposition after examination, as other medical preparations, and are not permitted to pass the custom-house unless the examiner be satisfied that they are fit and safe to be used for medicinal purposes.

In the State of New York the law expressly forbids adulterations of flour, hops, and spirits. Any one knowingly offering flour for sale mixed with Indian meal, or with any other mixture, or with unsound flour, is liable to a penalty of five dollars for every cask. Any one mixing with hops any foreign or improper substances, or in any manner adulterating their quality, is deemed guilty of misdemeanor, and punishable by fine or imprisonment, or both. Any one adulterating spirits with any poisonous substance, or substance injurious to health, or any one selling such spirits, knowing them to be adulterated, is deemed guilty of misdemeanor, and punishable by fine or imprisonment, or both; the fine in no case to exceed 1000 dollars, and the imprisonment in no case to exceed four years. The law also provides against the adulteration of oils, against the deceptive packing of hay, and even against frauds in linens and other goods, containing fewer yards of measurement than are marked upon them.

In England the law affords redress to consumers in cases of adulteration, by action, if the injury be individual in its character; by indictment, if the injury be general; by summary charge before a magistrate; and by proceedings instituted by the Excise. The process of action or indictment is at once too costly and too cumbrous for general adoption. That by summary charge before a magistrate, as well as that originating with the Excise, applies only to a few special articles which are named in particular Acts, or which are subject to the supervision, for fiscal purposes, of the Board of Inland Revenue; but your Committee are of opinion that it would be most desirable that, in all cases of the sale of an adulterated or fictitious article, a cheap and easy remedy, by summary charge before a magistrate, should be afforded to the person upon whom the fraud had been practised, and they would strongly recommend the propriety of such a change in the present law on this subject as would effect this object.

Your Committee desire specially to call attention to the provisions of the Bread Act, 6 and 7 Will. IV., c. 27. Section 2 provides that bread may be made of wheat flour, barley, rye, oats, buckwheat, Indian corn, peas, beans, rice, or potatoes, with any common salt, pure water, eggs, milk, barm, leaven, potato or other yeast, and with no other ingredients, subject to certain regulations. Any mixture besides those allowed in section 2 involves a penalty of £10, or not less than £5; or, in default, an imprisonment not exceeding six months, with or without hard labour; and, if the magistrate think fit, publicity of the offence by advertisement. Any one mixing with the corn, meal, or flour, any ingredient not the genuine produce of the corn or grain; or any one selling, or offering for sale, separately or mixed, any meal or flour of one sort of grain, as the meal or flour of any other sort, or any ingredient mixed with the meal or flour so sold, is liable to a penalty of £20, and not less than £5. All bread made with mixed meal or flour must be marked with a Roman M; the penalty for neglecting this provision being a fine not exceeding 10*s.* for every pound weight of bread not so marked. Magistrates, or peace officers by their warrants, may search premises, and seize any adulterated flour or bread, and search for any forbidden ingredient. The penalty, if ingredients for adulteration are found, is £10, or not less than 40*s.*, for the first offence, £5 for the second, and £10 for every subsequent offence, or in default, six months' imprisonment, with publicity as to the names of offenders. The Act also provides for an appeal to quarter sessions, and declares that no person shall be convicted unless complaint is made within forty-eight hours after the offence, or within such reasonable time as to the justices may seem fit.

Your Committee have given the provisions of the Bread Act in some detail, because it seems to them to comprise much that may be useful in framing a measure applicable to adulterations generally.

It is impossible to frame any enactment on this subject which shall rely on strict definitions. The object of the law is to strike at fraud, and wherever a fraudulent intention can be proved, there to inflict a penalty. What constitutes fraud must be left to the interpretation of the administrators of the law. Thus mixtures of an innocuous character, made known by the seller, or used for the preservation of the article, cannot be forbidden without danger to the needful freedom of commerce, and ought not to be interpreted as coming within the provisions of a penal law. Nor should those provisions apply wherever the seller can afford satisfactory proof that he has himself been deceived, and was not conscious of the adulteration practised; unless he have evinced a culpable ignorance of the trade which he professes to follow.

Subject to these qualifications, the law should be clear and positive in forbidding adulteration, and in punishing those who practise it.

Hitherto the progress of legislation has not kept pace with the ingenuity of fraud, which has not scrupled to avail itself of every improvement in chemistry or the arts which could subserve its purpose.

Although, however, the means of adulteration have greatly increased, so also, fortunately, have the facilities for detection, especially by the improved use of the microscope, which has been employed by Dr. Hassall and others with signal success.

At first, no doubt, some difficulty would be experienced in finding persons qualified to conduct the required chemical and microscopical examinations; but the want will soon give rise to the needful supply. This want has been already felt by the Board of Inland Revenue, which has been compelled, for the purposes of the analyses requisite in cases of adulterated articles of Excise, to educate persons for this special duty. In addition to about 4000 officers, scattered over the country, whose experience enables them to detect many adulterations, and to discover cases of strong suspicion, the Board employs about sixty to seventy analytical Chemists, whose numbers are recruited by students, educated for this purpose at University College, to the number of fourteen in every year. Mr. Phillips, the chief officer of the chemical department of the Board of Inland Revenue, states that the practice is for the officers, if they suspect a trader of adulterations, or on information given to them, to go and procure samples. Many are competent to examine samples on the spot. If they have any doubt of their own judgment, they send them to the laboratory to be further examined. And he adds, as showing the result of the system adopted by the Board, that adulteration has been totally stopped in some articles, and much diminished in others, from the very fact that traders know they are liable to inspection by the Excise officers.

It has been suggested that the prevention of adulterations in food might be accomplished by an extension of the system of the Board of Inland Revenue; but your Committee are of opinion that no machinery for this purpose will work satisfactorily unless the agents employed derive their authority from corporate or other local governing bodies.

It will be desirable, therefore, to empower municipal or other local or district authorities to appoint an officer or officers, who, on complaint made, or in cases of reasonable suspicion, shall procure portions of any article supposed to be adulterated, with a view to their examination or analysis by some duly qualified person appointed for that purpose. On the report of such persons, if it confirm the suspicion of adulteration, a summons shall be issued, and the case be investigated before the justices, who shall have power to inflict summary punishment, by fine or imprisonment, in every case where pecuniary fraud or danger to health shall have been proved. The justices should also be empowered to publish the names of offenders. The advantages of publicity have been urged by many witnesses, and especially by Dr. Hassall and Mr. Wakley, who attribute a recent great diminution in the amount of adulteration to the publication of names and other particulars in the reports of the "'*Lancet*' Commission." It is essential that a right of appeal should lie to the Court of Quarter Sessions.

With regard to coloured confectionery, your Committee recommend that authority should be given to local Boards of Health, or other governing bodies, to forbid the use, for colouring, of all mineral matter, and all poisonous vegetable matter.

But although your Committee desire to leave the execution of the law against adulteration in the hands of the local authorities, they are of opinion that very valuable assistance would be afforded to such bodies in ascertaining the fact of adulteration, if one or more scientific analyzers were to be appointed under the authority of the General Board of Health, to whom the local authorities might, whenever they thought fit, refer any articles seized under suspicion of adulteration, for analysis, and who would thus enable the persons charged with the administration of the law to obtain at once, and without cost, a fully competent opinion in all difficult cases.

These analyzers should also undertake to examine any articles sent to them by private individuals, on payment of the expenses of such examination.

Your Committee would also suggest that the General Board of Health should from time to time issue such information as to the nature of the adulterations of articles of food, &c., injurious to health, as may be obtained in the progress of scientific research on this subject, and as would serve to guide the local authorities in their endeavours to detect these frauds.

With reference to drugs, your Committee are of opinion that no inspection at the outports would guarantee to the consumer the purity of commodities passing through the hands of intermediate parties; and the exclusion of impure drugs would operate injuriously, by interfering with the supply obtained by scientific processes, calculated to extract valuable matter even from products seemingly almost worthless.

It has been suggested that chemists and druggists should be allowed to exercise their calling only under license. At present, to use the words of one of the witnesses, Mr. Jacob Bell, a man may be a shoemaker to-day and a chemist and dispenser of drugs to-morrow, though he cannot assume the name of "pharmaceutical chemist." The question of licences, however, may perhaps be properly deferred till it be seen how far the efforts of the Pharmaceutical Society and a more general system of inspection may prove successful. The existing powers of inspection in England are confined to the College of Physicians and the Apothecaries' Company. The powers of the latter are very limited, extending only to apothecaries' shops, and in no way to those of chemists and druggists. The College of Physicians has authority to inspect both the one and the other; but this authority is confined to the limits of the city of London, where inspection takes place three times a year. The inspection, however, seems to be too cursory to be of any great utility.

It has been shown that much good has arisen from the establishment of the Pharmaceutical Society, the members of which being specially educated in the knowledge of drugs, are better able than heretofore to make proper selections and to detect adulterations. Several witnesses, too, have borne testimony to the great advantage which would ensue if poor-law guardians and managers of hospitals and other similar institutions would, instead of accepting, as they too often do, the lowest tender for drugs, and, indeed, for articles of food also, cause them to be properly inspected, and, if needful, analyzed before admitting them into use.

Though not coming strictly within the scope of the inquiry entrusted to them, your Committee cannot forbear calling attention to the evidence concerning patent medicines, the sale of poisons, and the state of the Pharmacopœias of the three kingdoms.

With regard to patent medicines, there can be no doubt that the public health is endangered by the use of several of these compounds; and your Committee are of opinion that the stamp duty, by giving them a seeming Government sanction, has an injurious influence in encouraging their sale and consumption, and should be abandoned, whenever this can be done with a due regard to the wants of the public revenue.

The unrestricted sale of poisons is a matter of pressing importance, and deserves the early attention of the Legislature. At the present moment, the most violent poisons may be universally sold, without any restriction except such as is afforded by the sense of moral responsibility on the part of the dealer. It is needless to point out the serious consequences which frequently ensue from this unrestrained freedom. To take a familiar instance, it is stated in evidence that the essential oil of bitter almonds, and what is called "almond flavour," of very various strength, and containing highly dangerous elements, are openly and commonly sold for culinary purposes, and, in the hands of servants wholly ignorant of their properties, used in quantities often dangerous and sometimes fatal. It is well worthy of consideration, whether the sale of poisons should not be forbidden, unless under the authority of a medical prescription, or under such conditions, as to witnesses, and formal entries of the names and addresses of purchasers, as may secure the needful amount of caution.

The evil arising from the existence of three distinct and, in some important instances, widely differing Pharmacopœias for the three kingdoms, is one too evident to need enforcement. The result is, that many of the prescriptions of one country are not only inefficacious, but often absolutely dangerous, if made up in either of the others. One of the witnesses states, that an Edinburgh prescription containing a solution of morphia, made up in London, would involve the patient's taking twice the quantity intended. On the other hand, a patient taking prussic acid under an Edinburgh prescription, made up in London, would be taking only half the quantity intended; the Edinburgh prussic acid being twice the strength of the prussic acid of the London Pharmacopœia. This is an evil which can be remedied only by the combined efforts of the medical authorities of England, Ireland, and Scotland, to whom the subject should, without delay, be referred.

22nd July, 1856.

ROYAL INSTITUTION OF GREAT BRITAIN.

Friday, June 6, 1856.

COMPARATIVE VIEW OF THE CLEAVAGE OF CRYSTALS AND SLATE ROCKS.

BY JOHN TYNDALL, ESQ., F.R.S.,
Professor of Natural Philosophy in the Royal Institution.

When the student of physical science has to investigate the character of any natural force, his first care must be to purify it from the mixture of other forces, and thus study its simple action. If, for example, he wishes to know how a mass of water would shape itself, supposing it to be at liberty to follow the bent of its own molecular forces, he must see that these forces have free and undisturbed exercise. We might, perhaps, refer him to the dewdrop for a solution of the question; but here we have to do, not only with the action of the molecules of the liquid upon each other, but also with the action of gravity upon the mass, which pulls the drop downwards and elongates it. If he would examine the problem in its purity, he must do as Plateau has done, withdraw the liquid mass from the action of gravity, and he would then find the shape of the mass to be perfectly spherical. Natural processes come to us in a mixed manner, and to the uninstructed mind are a mass of unintelligible confusion. Suppose half a dozen of the best musical performers to be placed in the same room, each playing his own instrument to perfection: though each individual instrument might be a wellspring of melody, still the mixture of all would produce mere noise. Thus it is with the processes of nature. In nature mechanical and molecular laws mingle and create apparent confusion. Their mixture constitutes what may be called the *noise* of natural laws, and it is the vocation of the man of science to resolve this noise into its components, and thus to detect the "music" in which the foundations of nature are laid.

The necessity of this detachment of one force from all other forces is nowhere more strikingly exhibited than in the phenomena of crystallization. I have here a solution of sulphate of soda. Prolonging the mental vision beyond the boundaries of sense, we see the atoms of that liquid, like squadrons under the eye of an experienced general, arranging themselves into battalions, gathering round a central standard, and forming themselves into solid masses, which after a time assume the visible shape of the crystal which I here hold in my hand. I may, like an ignorant meddler wishing to hasten matters, introduce confusion into this order. I do so by plunging this glass rod into the vessel. The consequent action is not the pure expression of the crystalline forces; the atoms rush together with the confusion of an unorganized mob, and not with the steady accuracy of a disciplined host. Here, also, in this mass of bismuth we have an example of this confused crystallization; but in the crucible behind me a slower process is going on: here there is an architect at work " who makes no chips, no din," and who is now building the particles into crystals, similar in shape and structure to those beautiful masses which we see upon the table. By permitting alum to crystallize in this slow way, we obtain these perfect octahedrons; by allowing carbonate of lime to crystallize, nature produces these beautiful rhomboids; when silica crystallizes we have formed these hexagonal prisms capped at the ends by pyramids; by allowing saltpetre to crystallize we have these prismatic masses, and when carbon crystallizes we have the diamond. If we wish to obtain a perfect crystal we must allow the molecular forces free play: if the crystallizing mass be permitted to rest upon a surface it will be flattened, and to prevent this a small crystal must be so suspended as to be surrounded on all sides by the liquid, or, if it rest upon the surface, it must be turned daily, so as to present all its faces in succession to the working builder. In this way the scientific man nurses these children of his intellect, watches over them with a care worthy of imitation, keeps all influences away which might possibly invade the strict morality of crystalline laws, and finally sees them developed into forms of symmetry and beauty which richly reward the care bestowed upon them.*

In building up crystals these little atomic bricks often arrange themselves into layers which are perfectly parallel to each other, and which can be separated by mechanical means; this is called the cleavage of the crystal. I have here a crystallized mass which has thus far escaped the abrading and disintegrating forces which sooner or later determine the fate of sugar-candy. If I am skilful enough I shall discover that this crystal of sugar cleaves with peculiar facility in one direction. Here again I have a mass of rock-salt: I lay my knife upon it and with a blow cleave it in this direction; but I find on further examining this substance that it cleaves in more directions than one. Laying my knife at right angles to its former position, the crystal cleaves again; and finally placing the knife at right angles to the two former positions, the mass cleaves again. Thus rock-salt cleaves in three directions, and the resulting solid is this perfect cube, which may be broken up into any number of smaller cubes. Here is a mass of Iceland spar, which also cleaves in three directions, not at right angles, but oblique to each other, the resulting solid being a rhomboid. In each of these cases the mass cleaves with equal facility in all three directions. For the sake of completeness I may say that many substances cleave with unequal facility in different directions, and the heavy spar I hold in my hand presents an example of this kind of cleavage.

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* To Mr. Pattinson, of the Felling Chemical Works, Newcastle-upon-Tyne, I am indebted for some fine specimens of crystallized alum and carbonate of soda.

Turn we now to the consideration of some other phenomena to which the term cleavage may be applied. This piece of beech-wood cleaves with facility parallel to the fibre, and if our experiments were fine enough we should discover that the cleavage is most perfect when the edge of the axe is laid across the rings which mark the growth of the tree. The fibres of the wood lie side by side, and a comparatively small force is sufficient to separate them. If you look at this mass of hay severed from a rick, you will see a sort of cleavage developed in it also; the stalks lie in parallel planes, and only a small force is required to separate them laterally. But we cannot regard the cleavage of the tree as the same in character as the cleavage of the hayrick. In the one case it is the atoms arranging themselves according to organic laws which produce a cleavable structure, in the other case the easy separation in a certain direction is due to the mechanical arrangement of the coarse sensible masses of the stalks of hay.

In like manner I find that this piece of sandstone cleaves parallel to the planes of bedding. This rock was once a powder, more or less coarse, held in mechanical suspension by water. The powder was composed of two distinct parts, fine grains of sand and small plates of mica. Imagine a wide strand covered by a tide which holds such powder in suspension:* how will it sink? The rounded grains of sand will reach the bottom first, the mica afterwards, and when the tide recedes we have the little plates shining like spangles upon the surface of the sand. Each successive tide brings its charge of mixed powder, deposits its duplex layer day after day, and finally masses of immense thickness are thus piled up, which by preserving the alternations of sand and mica tell the tale of their formation. I do not wish you to accept this without proof. Take the sand and mica, mix them together in water, and allow them to subside, they will arrange themselves in the manner I have indicated; and by repeating the process you can actually build up a sandstone mass which shall be the exact counterpart of that presented by nature, as I have done in this glass jar. Now this structure cleaves with readiness along the planes in which the particles of mica are strewn. Here is a mass of such a rock sent to me from Halifax: here are other masses from the quarries of Over Darwen, in Lancashire.† With a hammer and chisel you see I can cleave them into flags; indeed, these flags are made use of for roofing purposes in the districts from which the specimens have come, and receive the name of "slatestone." But you will discern, without a word from me, that this cleavage is not a crystalline cleavage any more than that of a hayrick is. It is not an arrangement produced by molecular forces; indeed, it would be just as reasonable to suppose that on this jar of sand and mica the particles arranged themselves into layers by the forces of crystallization, instead of by the simple force of gravity, as to imagine that such a cleavage as this could be the product of crystallization.

This, so far as I am aware of, has never been imagined, and it has been agreed among geologists not to call such splitting as this cleavage at all, but to restrict the term to a class of phenomena which I shall now proceed to consider.

Those who have visited the slate quarries of Cumberland and North Wales will have witnessed the phenomena to which I refer. We have long drawn our supply of roofing-slates from such quarries; schoolboys ciphered on these slates, they were used for tombstones in churchyards, and for billiard-tables in the metropolis; but not until a comparatively late period did men begin to inquire how their wonderful structure was produced. What is the agency which enables us to split Honister Crag, or the cliffs of Snowden, into laminæ from crown to base? This question is at the present moment one of the greatest difficulties of geologists, and occupies their attention perhaps more than any other. You may wonder at this. Looking into the quarry of Penrhyn, you may be disposed to explain the question as I heard it explained two years ago. "These planes of cleavage," said a friend who stood beside me on the quarry's edge, "are the planes of stratification which have been lifted by some convulsion into an almost vertical position." But this was a great mistake, and indeed here lies the grand difficulty of the problem. These planes of cleavage stand in most cases at a high angle to the bedding. Thanks to Sir Roderick Murchison, who has kindly permitted me the use of specimens from the Museum of Practical Geology (and here I may be permitted to express my acknowledgments to the distinguished staff of that noble establishment, who, instead of considering me an intruder, have welcomed me as a brother), I am able to place the proof of this before you. Here is a mass of slate in which the planes of bedding are distinctly marked; here are the planes of cleavage, and you see that one of them makes a large angle with the other. The cleavage of slates is therefore not a question of stratification, and the problem which we have now to consider is, "By what cause has this cleavage been produced?"

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* I merely use this as an illustration; the deposition may have really been due to sediment carried down by rivers. But the action must have been periodic, and the powder duplex.

† For the specimens from Halifax I have to thank Mr. Richard Carter, and for those from Darwen I am indebted to Mr. J. Singleton.

In an able and elaborate essay on this subject in 1835, Prof. Sedgwick proposed the theory that cleavage is produced by the action of crystalline or polar forces after the mass has been consolidated. "We may affirm," he says, "that no retreat of the parts, no contraction of dimensions in passing to a solid state can explain such phenomena. They appear to me only resolvable on the supposition that crystalline or polar forces acted upon the whole mass simultaneously in one direction and with adequate force." And again, in another place: "Crystalline forces have rearranged whole mountain masses, producing a beautiful crystalline cleavage, passing alike through all the strata."* The utterance of such a man struck deep, as was natural, into the minds of geologists, and at the present day there are few who do not entertain this view either in whole or in part.† The magnificence of the theory, indeed, has in some cases caused speculation to run riot, and we have books published, ay, and largely sold, on the action of polar forces and geologic magnetism, which rather astonish those who know something about the subject. According to the theory referred to, miles and miles of the districts of North Wales and Cumberland, comprising huge mountain masses, are neither more nor less than the parts of a gigantic crystal. These masses of slate were originally fine mud; this mud is composed of the broken and abraded particles of older rocks. It contains silica, alumina, iron, potash, soda, and mica mixed in sensible masses mechanically together. In the course of ages the mass became consolidated, and the theory before us assumes that afterwards a process of crystallization rearranged the particles and developed in the mass a single plane of crystalline cleavage. With reference to this hypothesis, I will only say that it is a bold stretch of analogies; but still it has done good service; it has drawn attention to the question; right or wrong a theory that is thoughtfully uttered has its value; it is a dynamic power which operates against intellectual stagnation; and even by provoking opposition is eventually of service to the cause of truth. It would, however, have been remarkable, if, among the ranks of geologists themselves, men were not found to seek an explanation of the phenomena in question, which involved a less hardy spring on the part of the speculative faculty than the view to which I have just referred.

(*To be continued.*)

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* *Transactions of the Geological Society*, ser. ii., vol. ii., p. 477.

† In a letter to Sir Charles Lyell, dated from the Cape of Good Hope, February 20, 1836, Sir John Herschel writes as follows:—"If rocks have been so heated as to allow of a commencement of crystallization, that is to say, if they have been heated to a point at which the particles can begin to move amongst themselves, or at least on their own axes, some general law must then determine the position in which these particles will rest on cooling. Probably that position will have some relation to the direction in which the heat escapes. Now, when all or a majority of particles of the same nature have a general tendency to one position, that must of course determine a cleavage plane."

MEDICAL PATRONAGE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I would respectfully request insertion for the following in the Journal of next month, in order that one more may be added to the already numerous recorded instances of medical patronage or pharmaceutical meanness, I know not which, for it may be that this prescription after all was written by a "Chemist and Druggist:"—

℞ Ferri sulph., gr. pc.
Pulv. Myrrhæ, gr. h.
Aloes sp., gr. pc.
Camphoræ, gr. m.
Quin. disulph., gr. h.
Ext. hyoscyam., gr. s.

ɱ Sp. Camphorâ et div. in pil. xij—st j bis terve in die—(ol. sub. gt. vj. sos).

The above is an exact copy of a prescription brought to me this day. The prescription has evidently been pasted on another piece of paper to preserve it, and on being held up to the light, the name of the person (for whose especial use and benefit this choice production was intended) is visible. This I of course refrain from giving, as the patient is in these cases the duped, and not the consenting party, to the fraud. On the back may also be seen the remains of some prescription, running thus:—vel. ij. pro dosi—h. s., and below this

"The Brighton Digestive and Stomach Pills."
℞ Pil. Rhei Co., gr. pe.

By these detached tit-bits it is evident that we have in the above only the remains of a more extensive and elaborate production. I am, Sir, yours respectfully,

Edward Wood.

31, *Richmond Place, Brighton, Aug.* 7, 1856.

ACCIDENTAL POISONING BY LAUDANUM.

An inquest was held on Saturday, Aug. 16th, at the Star Inn, Stalybridge, before Mr. Rutter, county coroner, and a jury, touching the death of Elizabeth Bramhall, aged twelve years, who died on Friday from the effects of laudanum given to her in mistake for tincture of rhubarb. Mr. Taylor, solicitor, Stalybridge, was present on behalf of Mr. Lees. The jury being sworn, and having viewed the body, Mary Bramhall, mother of the deceased, stated that her daughter, thirteen years of age, had the bowel complaint on Wednesday, which continued till Thursday night, when she sent her daughter Mary, aged fifteen, to Mr. John Lees, Druggist, Rasbottom Street, for two pennyworth of tincture of rhubarb. She took a teacup, and returned in about a quarter of an hour; there was something in the cup which had the appearance of tincture of rhubarb. Witness put some warm water and sugar to it, and gave it to deceased, who said it was bitter, and shortly after taking it complained of stiffness in her legs; in about an hour vomiting came on, and difficulty of breathing, when Mr. Pearson was sent for, who did all in his power, but she died at a quarter to three o'clock on Friday afternoon. Witness was sure she sent for tincture of rhubarb; had never bought or used laudanum.—Mary Bramhall corroborated her mother's evidence; said she was served by Mr. Lees; was quite sure she did not ask for laudanum, but for "two pennyworth of tincture of rhubarb."—Mr. John Pearson, surgeon, Stalybridge, stated that he was sent for to see the deceased, and found her in what, at first, he thought the last stage of collapse from English cholera; but finding the skin of an unnatural heat, he inquired what had been given. The mother replied, "tincture of rhubarb," and produced the cup, when he found that it contained laudanum. The stomach-pump and other means were used, but were of no avail. Witness, with the assistance of Mr. Anderson, made a *post mortem* examination of the body, and found all the symptoms which might be expected from poisoning by laudanum and no other cause of death. In answer to Mr. Taylor, witness said he could not undertake, from the appearances alone, to say that the death was caused by laudanum.—Mr. C. Anderson, surgeon, corroborated Mr. Pearson's evidence, and considered the symptoms such as would be produced by an excessive dose of laudanum.—The Coroner, in summing up, said there were two points for the consideration of the jury. First, were they convinced that Mr. Lees had sold laudanum instead of tincture of rhubarb? On that point, he thought there could be no doubt. The other point was, had Mr. Lees used such a degree of caution as was required, or been guilty of such gross negligence as to render him criminally liable? Had he hastily and without caution supplied the mixture? If so, he was bound to say it would be a case of manslaughter; but if the mixture had been given through such a mischance as any man might be guilty of, then the case would be one of mere misadventure; but, he was bound to add, that a man in Mr. Lees' capacity was bound to exercise caution, and to be exceedingly careful in his business.—The room was then cleared, and in a short time the jury returned a verdict that "The deceased came to her death from the effects of laudanum, sold by Mr. John Lees for tincture of rhubarb in mistake."—The Coroner said this verdict did not amount to manslaughter; and, after a few words, he said he trusted Mr. Lees would do something for the family.—Subsequently Mr. Lees handed Mr. Superintendent Sadler £5 for the benefit of the family of the deceased.

AN UNSUCCESSFUL ATTEMPT TO POISON A HUSBAND WITH ARSENIC.

South Lancashire Assizes, Monday, August 19th, 1856.

BEFORE MR. JUSTICE WILLES.

JANE NEWTON, aged thirty (weaver), was indicted for having on the 5th of May administered to Henry Newton, her husband, half an ounce of arsenic, with intent to murder him. Mr. Serjeant Wilkins opened the case for the prosecution.

The prisoner had been married about eight years, had borne four children, two of whom were dead—a fifth expected. On the 4th of May the husband was in good health; on the following morning the prisoner purchased some stew for the family breakfast, and poured a portion into three pots for the children and her husband, the remainder being retained in the jug for herself. Before her husband came down she was seen stirring his portion with a tablespoon, but she did not stir any of the others. He came down, took part of his breakfast, and said he could take no more, and would divide what was left between the two children, which he did, and then went out and vomited violently. As soon as he was gone out the prisoner took the stew from the children, saying, "it has done him no good, it will do them no good," and she threw it into the ash heap. Some fowls in the yard where the husband vomited, were taken ill soon afterwards and died. On dissection, arsenic was found in their bodies. One of the children who had tasted the father's stew before the prisoner had time to remove it, was taken ill with vomiting, but shortly recovered. The husband continued vomiting violently until Wednesday night. He was attended by two medical men, Messrs. Kitson and Hunt. His brother and sister were sent for, and the former, on his arrival, immediately accused the prisoner of having attempted to poison her husband. She denied it, but for the first time admitted that she had on the previous Friday bought a quarter of a pound of arsenic of a druggist in the town for the purpose, as she said, of purifying the beds from fleas.

This statement about the fleas was proved to be untrue. When the husband heard it, he started, and the brother told the prisoner she had better be off, or she would very soon be in the custody of the police. She at once put on her shawl and left the house, but was apprehended on the following day. The matters vomited by the husband having been examined, a considerable portion of arsenic was detected, quite sufficient to account for the symptoms.

It transpired that the prisoner on the previous Friday had called on a neighbour, Mrs. Grimes, and told her she was fatigued with cleaning the flocks of the beds, and that she was infested with fleas, asking her to go with her to Mr. Waterhouse, a druggist, for some arsenic, which she did. When the assistant came in she asked him if he sold mercury, and asked for a quarter of a pound. While the young man was weighing it, Mr. Waterhouse came in, and asked him if he knew what it was wanted for. He said, "Yes, to kill fleas." He then said to the prisoner, "You must be careful, it is very severe stuff." She said, "There is a person here has used it."

The assistant, *Peter Reddin*, in his evidence said, he was assistant to Mr. Waterhouse; he remembered three females coming in for mercury to kill vermin; he said, "I supplied them with arsenic—arsenic and mercury are the same thing—Mr. Waterhouse was there, he received the money." He did not know who it was that came for the arsenic. In answer to the judge, he said, "A teaspoonful of arsenic will kill a person. I am seventeen years of age."

Several witnesses gave evidence on the subject of the stew, and on some other matters of small importance.

Ralph Clough, secretary to the Foresters' Club, deposed that at Newton's death his wife would become entitled to £8 from the club.

Mr. Stone, Analytical Chemist at the Ashton School of Anatomy, said he had examined the contents of the bottles brought to him, and also the crops of a hen and chicken, and found sufficient arsenic to cause death. Three or four grains would cause death to a man.—*His Lordship*. What would a teaspoonful do?—*Witness*. Poison twenty or thirty people.—*His Lordship* (to the jury). You will remember that the druggist's boy said a teaspoonful would poison an adult.—*Witness* had tested the flocks, but found no arsenic in them.

The medical evidence was conclusive as to the symptoms of poisoning by arsenic. The aunt of the prosecutor deposed that on the 5th of May she had accused the prisoner of attempting to poison her husband, and she replied, "I have not. What should I do if anything happened to him, seeing that I have these two children, and in the family way again?"

Mr. Sowler, on behalf of the prisoner, addressed the jury at great length; found fault with his learned friend for not bringing forward either of the children as a witness; endeavoured to shake the testimony generally; censured the druggist's boy; and suggested the possibility of the affair being merely an accident, from the incautious use of a dangerous substance by an ignorant woman.

The jury, after a consultation of a quarter of an hour, returned a verdict of Not Guilty, and the prisoner was discharged. The foreman then said, "We wish to express to your Lordship our sense of the very reprehensible practice which exists of selling poisons indiscriminately." His Lordship said he felt quite as strongly as the jury did the force of their observation, and thanked them for directing attention to it. He considered it truly monstrous in such a country as this, where human life is so valuable, that these poison shops should be selling deadly poisons, arsenic, for instance, under a slang name, without restriction, and hoped those who have the power of altering the law would have their attention directed to the subject.

POISONING BY ANTIMONY.

The trial of Betsy M'Mullan for the murder of her husband at Bolton, on the 2nd of July last, by administering to him small doses of antimony, took place at Liverpool, August 22 and 23, before Mr. Justice Willes. Mr. Overend, Q.C., and Mr. Sowler, appeared for the prosecution; and Mr. Serjeant Wilkins and Mr. Torr for the defence.

The particulars of the case as elicited at the inquest were given in our last number, page 147; it will, therefore, be sufficient to give the further details comprised in the summing up of the judge, with the verdict of the jury.

His Lordship then proceeded to sum up. He said, whatever the result of this case might be, it could not fail to be a great satisfaction that the matter had been ably discussed by the counsel on both sides. The duty of the jury was to inquire into the cause of the deceased's death, and if they thought it was caused by the act of the prisoner intentionally done to do the deceased harm, they must find the prisoner guilty of murder. If, on the contrary, they thought she had administered to her husband, without his knowledge, a drug with the purpose, not of doing him harm, but to cure him of drunkenness, then they must find her guilty of manslaughter. He wished to state that no woman had a right, whether for good or evil, to administer doses of any drug to her husband without his knowledge and consent. It was contrary to law, and might lead to the worst results to the husband by destroying his constitution, and might end in dosing him to death. It was suggested that the man's death might have resulted from the administration of what was called "quietness." The word was a most suggestive one, and was appropriated to a substance the effect of which was to produce a dulness of the vital powers, and which might proceed to greater lengths, and instead of producing the "quietness" of sobriety, might produce the "quietness" of death. Turning to the facts of the case, were they satisfied that the administration of antimony caused or accelerated the death of the deceased? If so, were they satisfied that it was administered by the prisoner; and if so, with an evil intention? If so, then their only duty was to find her guilty of the entire charge. Even without that intention, if administered without the knowledge of the husband, she would be guilty of manslaughter. His Lordship then went carefully through the whole evidence.

The jury retired, and, after a long absence, returned with a verdict of *Guilty* of manslaughter, but they desired to say they had taken a merciful view of the case.

The prisoner was then called upon to receive her sentence.

His Lordship, addressing her, said:—Betsy M'Mullan, you have been convicted of the manslaughter of your own husband, which you appear to have effected by repeated doses of a poisonous drug, and you gave him those doses, not only when well and out of the doctor's hand, but also when under the doctor's hands. It appears that at Bolton a practice exists of giving husbands doses of this description. I know not what other women who have been present at this trial may think, but to me nothing can be so repugnant to all mutual feelings of confidence and kindly affection between husband and wife. The idea that a woman, lying on a man's bosom, and almost breathing his breath, should be guilty of such acts, seems to me perfectly terrible. In your case the jury have acquitted you of the graver charge of murder, and they have expressly said "that they have taken a merciful view of your case." The prerogative of mercy does not rest with the jury—that is a matter for the Crown; but I take the expression of the opinion of the jury to be that the evidence in your case, though very strong, is not sufficient to satisfy their minds that you are guilty of murder. For myself, I confess, if I were now to pronounce sentence, my own feeling is that, in order to prevent your doing any mischief for the remainder of your life, I should sentence you to transportation for that period; but I think it better to consult my notes and brother judge in the first instance, and I shall not therefore sentence you until Monday. The learned Judge then raising his voice, and addressing the body of the Court, said—I likewise think it right to state, that if Mr. Simpson, or any other person engaged in the sale of drugs chooses to sell to married women such poisonous drugs without the knowledge of their husbands, and well knowing that they are intended to be administered to their husbands, no matter for what purpose, and death ensues, I repeat that Mr. Simpson and all others so acting are equally guilty of manslaughter.

DOVE'S CONFESSION.

It is satisfactory to find that the scientific evidence in this case is corroborated by the confession of the murderer, who appears to have been instigated in some degree by Harrison, an astrologer, whom he had consulted. It appears that Dove desired to take a farm, and we find this worthy disciple of the black art planting pieces of copper, on which he had marked some hieroglyphics, in different parts of the house, which he tells Dove is "bewitched;" he then offers up a prayer, in which the seven wise men are referred to. For the purpose of enabling Dove to take the farm, he gives him a piece of paper, on which he had written some hieroglyphical signs: he was also consulted by Dove respecting his wife, and Harrison tells him that he will never be happy until she is out of the way; and Dove concludes his confession by saying that he should never have committed the crime but for the instigation of Harrison. He appears to have been guided in the selection of means for carrying out his purpose by the disclosures in Palmer's case, showing the tendency of such publicity to induce a repetition of the crime.

SPONTANEOUS COMBUSTION. (?)

Much curiosity has been excited in the town of Bedford by some rather extraordinary occurrences, which have been attributed to spontaneous combustion. The following are the principal facts of the case as reported:—

Some ignited sulphur having been placed in a basinette, for the purpose of fumigating a room, in the space of two hours it was found that the sulphur had burned through and ignited the floor; but the fire was extinguished, and all was considered safe. Two or three days afterwards, the master of the house, on retiring to rest, threw his damp socks on the carpet, when, to his astonishment, they ignited! The next morning fire was again discovered in the house; and during the day no less than thirty fires broke out in different parts of the house. Every room in the house appeared to be charged with some self-igniting gas; smoke issued from cupboards, drawers, and boxes which had not been opened for some time. It is said that one gentleman laid his handkerchief on the sofa, when it forthwith ignited: another, when washing his hands, found that the damp towels on the horse in the bedroom were on fire.

Application was made to the coroner, who summoned a jury of the most respectable tradesmen of the town, who were engaged for the greater part of two days in investigating the matter. The medical testimony of Dr. Barker and Mr. Blower, who visited the scene, was given. These gentlemen were of opinion that the sulphurous fumes in connexion with the gas of the charred wood, had charged the entire house with inflammable gas, which, in some cases by friction, in others by electricity, had been from time to time ignited. It is said that the depositions will be submitted to some eminent chemists, in the hope that they may be able to give a more precise solution of the mystery. The verdict of the jury was, as far as the first fire was concerned, "Accidental;" with regard to the other fires, the verdict was an open one.

[We are not informed whether the house was heavily insured?—Ed.]

BOOKS RECEIVED.

An Introduction to Practical Pharmacy; *designed as a Text-Book for the Student, and as a Guide to the Physician and Pharmaceutist. With many Formulas and Prescriptions.* By Edward Parrish, Graduate in Pharmacy, Member of the Philadelphia College of Pharmacy, &c., &c. With 243 Illustrations. Philadelphia: Blanchard and Lea. 1856. Pp. 544.

Observations on Perfumery; *chiefly illustrating its Origin and Progress.* By T. Forster Ker, M.R.P.S., &c. Edinburgh: Thomas Grant; London: Houlston and Stoneman. 1856.

TO CORRESPONDENTS.

Case of Imposition.—A person, under the name of Lalouette, has been making a canvass among Chemists, and in some places levying contributions to a considerable amount, by an appeal to their charitable feelings. He states that he formerly lived in the house of Godfrey and Cooke, and was displaced to make way for Mr. Joseph Ince. He exhibits a letter, purporting to be written by Mr. Ince, and recommending him to favourable consideration. The letter is not genuine. The individual was never in the house of Godfrey and Cooke, and his entire statement is fabulous. We are informed that he has been successful in his canvass at Norwich, and was in a fair way to prosper at Leeds, when, unfortunately for him, the secretary of a local association, to which he applied, wrote to Mr. Ince in London, and the imposition was detected.

Adulterated Pepper.—For selling as pepper a compound containing 15 per cent. of ground rice, Mr. Anthony Tottenham, Druggist, Brill, was, a few days since, convicted by the Rev. G. Chetwade and G. Martin in £25 fine.—*Observer*, Aug. 24.

Essence of Rennet.—Mr. Houlton (Wetherby) has sent the following formula:—

One fresh rennet (or calf's stomach)
¾ gallon boiling water
20 oz. salt. Set by for twelve hours, and strain; then add
Spirit of Wine 6 oz.

Pulvis Bismuthi Compositus, *Pharm. Hospital for Skin Diseases.*—A Correspondent has drawn our attention to the inconvenience arising from medical men prescribing the above preparation, the composition of which is not generally known. We therefore publish the formula :—

℞ Bismuthi Trisnitratis, ℥j.
Plumbi Chromati, ℈j.
Carminii, gr. x.
Hydrargyri Bisulphureti,gr. x. Misce benè leviga.
—*Pharmacopœiu Noscomii in Curam Morborum Cutaneorum.*

One tablespoonful to a quart of new milk. It will form a firm curd in five minutes, if kept in a warm place.

M. Y. (Preston).—*The title Pharmaceutical Chemist.* See page 1 of the present volume.

A. P. S. (Plymouth).—*English Oak Galls.* The more recently collected would probably contain more tannin. See page 137 of our last number.

J. R. (Leith).—Boiling is generally necessary ; but the time required would depend on the nature of the ingredients.

A Student (Evesham).—Balfour's *Manual of Botany*, 12*s.* 6*d.* Griffin and Co.

Enquirer (Cheltenham).—The label referred to is liable to stamp duty.

Amator Scientiæ (Reading).—No acid is required. The condition of the alkaloid would most probably remain unchanged.

A. P. S. (London) suggests the propriety of Students who have passed their examinations advertising the same in their county papers, not only as a means of making it known to the public, but as a stimulus to other Students.

Chemicus.—(1.) Potassæ Superoxalas and Potassæ Bitartras.—(2.) Apply by letter to the Secretary, 17, Bloomsbury Square.

The specimen of orthography and the handbill from Cardiff have been received.

"*A Botanical Student*" (?) complains of the condition that the candidate obtaining the prize shall give up his herbarium to the Society, which prevents him (the student) becoming a competitor, as he thinks his herbarium would be worth much more than the medal. [If it be so, he had much better keep it. It would be very little extra trouble to preserve a duplicate of each specimen.]

A Chemist (Bromley).—The sale of Steedman's powders separately is a question for the Stamp Office to decide. The sale of a spurious imitation, if proved, would be punishable as a fraud.

M. P. S. complains of a maker of Brighton Seltzer Water charging it only 3*s.* a dozen. He also complains of the insertion of the advertisement on the cover of this Journal. [Quack medicines, as a general rule, are excluded. Seltzer water being prepared according to a published analysis, does not come under that head. The price is a question of competition, over which we have no power. The purchaser must judge of the quality.]

S. A. W.—The letter is omitted for reasons which will be appreciated by the writer on reference to an article in this number, in which we have endeavoured to carry out the suggestion.

The Collection of Indigenous American Plants, announced in a previous number as a donation from Mr. Procter, jun., has safely arrived in Bloomsbury Square. A detailed notice of the above is reserved for the next Pharmaceutical Meeting, to be held on the 1st of October.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd) to Mr. Churchill, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XVI.—No. IV.—OCTOBER 1st, 1856.

A PASSING SKETCH OF THE STATE OF PHARMACY IN FRANCE AND IN GREAT BRITAIN.—THE LICENCE IN PHARMACY.

It is generally said of the French that they are not a "physic-taking" people; but when they require medicine, they like to have it good, and the Legislature of the country indulges this disposition by making provision for the education of those who dispense, as well as those who prescribe, medicines. The English, who are renowned as "physic-takers," are less thoughtful about what they take or how it is prepared, so long as they get plenty for their money. The British Legislature, therefore, leaves these matters to be regulated by chance, trusting to free-trade and competition for the supply of the wants of the public. The idea alluded to in our last number of introducing a Licence in Pharmacy is due, so far as the public is concerned, to an ephemeral panic produced by recent fatal accidents from poison, and certain revelations before the Parliamentary Committee on Adulteration, which demonstrate in a forcible manner the necessity for a general improvement in the education of those who sell and dispense medicines. "They manage these things better in France," as Sterne said; and before the good idea of doing something has had time to evaporate, it may be well to take a bird's-eye view of the system which prevails in France. The public is a fickle animal. It is either fast asleep or in a state of great excitement, arising probably from some passing event, or from the caprice of the moment. As soon as the ebullition has subsided, or the cause of it ceases to obtrude itself as a novelty, the public falls asleep again. But it is the policy of those who look beyond the present moment, and desire to promote the permanent welfare of the public, to use the passing storm as a propulsive force to fill their sails, and drive onwards the cause of reform.

The pivot upon which rests the superiority of French Pharmacy is the great fact, that wherever the word "PHARMACIE" is inscribed outside a drug establishment, the occupant is what his name implies, a PHARMACIEN. It is a comfortable reflection to a stranger overtaken with the stomach-ache, that in such an establishment he will find a man of education and intelligence, varying, of course, in degree, but in all cases sufficient to inspire confidence, and to assure him that he is not likely to be recklessly poisoned. In England he might see the words *Chemist and Druggist* over the door, the symbols of an occult science on the show-bottles, and an ample supply of drugs within. He might require a dose of mercury, and an apprentice-boy might give him arsenic, not knowing the difference; or, the scales being out of order, he might fall into the hands of a precocious youth, who boasts that this is of no consequence, as he has served a year of his time, and "can guess calomel." Such may be exceptional cases—probably rare exceptions—but they serve to show the state of the law, and the lower end of the sliding scale between a qualified Pharmaceutist and a class of shopkeepers, who, according to the laws of our country, are equally recognized as Chemists and Druggists.

It may be instructive to take a peep at a first-class *Pharmacie* in Paris. The shop, although not large, is commodious, and elegantly fitted with every convenience for retail and dispensing business. Four or five assistants are engaged in that department. Close at hand is the sanctum of the principal, which is a library, studio, and testing-room. In the window is a table furnished with all the apparatus requisite for minute chemical analysis. The tests ranged on shelves on each side, the delicate balance, blow-pipe, spirit-lamp, tubes, capsules, &c. Everything is in perfect order, an analysis is in progress, and we must not intrude longer. On the other side of a yard is the laboratory, well supplied with stills, evaporating pans, presses, and other apparatus for pharmaceutical purposes. Three or four assistants are occupied in these processes. There are separate rooms or compartments for pills, lozenges, powders, poisons, tinctures, and general stock; also a warehouse for mineral waters. A great variety of pills are kept in stock; they are all silvered, and the rotundity of each pill is as perfect as that of a bullet cast in a mould. This is effected by a very simple contrivance. The ordinary pill machine seldom finishes the pills completely—never, unless the size of the pills corresponds precisely with the calibre of the machine. To ensure their perfect rotundity, they are afterwards placed in a circular tray, under a smaller tray inverted, the rim of the latter being adjusted according to the size of the pills. By a rotatory motion of the smaller tray within the larger one the pills within it are made perfectly round, and are then silvered in the usual way. We might enlarge upon the scientific and literary labours of the Pharmaciens of the first class in Paris, but our object is not to show what may be done by a few, but what ought to be the regular and general standard of proficiency among the class. In order to provide for the requirements of large cities, such as Paris, Lyons, Strasbourg, &c., and also for the wants of small villages or thinly-populated districts, two classes of Pharmaciens are licensed, the rank of each corresponding with the qualification, and those of the second class being licensed for certain localities. Pharmaciens of the first class must be good practical chemists. They are obliged to undergo a prescribed course of study, to prepare some chemical and pharmaceutical products, and to write a thesis, before receiving the diploma. Among such men, therefore—although there may be much difference in the amount of talent and industry displayed by individuals—the minimum qualification, without which none can pass, is a guarantee to the public that the possessor of the diploma is a man of education. Pharmaciens of the second class are chiefly engaged in remote villages, or in such districts as are in England supplied by the huckster or general dealer.

One establishment claims a passing notice—namely, the *Pharmacie centrale des Pharmaciens de France*, which was instituted by a company of Pharmaciens for the supply of themselves and others with genuine drugs and chemicals. It resembles the Apothecaries' Hall in London, but has no retail department. M. Dorvault (author of *L'Officine*) is the director, occupying a position similar to that of our friend Mr. Warington. The premises are located in a small street, so narrow at one end that only one vehicle can pass. A stranger might suppose that he had mistaken the address; but all doubt is removed by the appearance of a strong muster of carboys, and hampers packed for travelling, and an unmistakable odour of physic which is recognized on approaching the door. This opens almost directly into a large room, which appears to be the general packing-room. The walls are furnished with shelves for drugs in bottles, jars, boxes, &c. The counters are covered with packages, and several young men are calling over lists of drugs to see that the invoice is correct. To the left is the poison-room, which is enclosed in wire-gauze, and is under the charge of one assistant, whose sole occupation is among these instruments of death. The sight of this "poison-man" in wire-gauze is impressive, and reminds us of Davy's safety-lamp, which has the same object—namely, that of saving human life. Further on, to the left, up an obscure flight of stairs, the visitor feels his way to another room, the same size as the former, and appropriated to similar purposes. At one corner a door leads to the sanctum of the director, which is provided with a counter and complete apparatus for testing samples of drugs before or after purchase. An inner room is fitted up as a small museum, and contains specimens of curious, rare, or otherwise interesting objects connected with Pharmacy and Materia Medica. In another part of the premises there is a small room under lock and key, containing costly chemicals, such as quinine, &c.; a room appropriated to herbs, and patent or proprietary medicines; a room for powders; a lozenge-room, where there is a very ingenious machine, which can scarcely be described without a woodcut. In its general construction it may be compared to a steam printing-press in miniature, the cylinder being about a foot long and eight or ten inches in diameter. It is turned by an ordinary handle, and as the lozenge mass rolled out to the proper thickness is placed on the machine, it is drawn forwards by the cylinder, and the lozenges turned out at the other side, like sovereigns in the Mint. In this manner two persons can make more than 200 lbs. of lozenges in a day, not one of them being touched with the fingers. There is a six-horse power steam-engine, with drug-mill; sieves and mortars worked by steam; and a very effective apparatus for cutting sassafras or other roots. The laboratory contains a number of evaporating pans, chiefly for the naked fire or water-bath, a vacuum apparatus, stills, filters, presses, &c. We are informed that the concern is about to be removed into more extensive premises. There is a branch establishment at Lyons, which is also in process of enlargement.

Some jealousy, we believe, exists between the large manufacturing chemists and this company, the effect of which is to excite emulation in regard to the quality of the drugs and preparations. A considerable number of the Pharmaciens of Paris and the Departments, having a pecuniary interest in the company, and being also purchasers of the stock, a double motive exists for keeping up the character of the concern, and those who enter into competition must, in like manner, sustain their professional reputation. The usual phases of human nature are observable in France as in England, and competition prevails alike in both countries; but the nature of the competition varies according to the circumstances and demands of the locality. In England, where a considerable proportion of the buyers are unable to judge of the quality of the drugs and chemicals offered to them, the usual bait is a low price, and when the profit of the seller has been cut down to nothing, the natural effect of pushing the competition further, is a deterioration of the quality of the articles, in obedience to the demand. In the absence of easy and generally practicable means of detection, the most severe laws, inflicting penalties on the delinquents, will be inoperative. Of this fact, the law against the use of alum in bread is a striking example. Those theorists who propose to put an end to the abuses in question, by bringing down the sledge-hammer on the heads of manufacturers, who fabricate whatever suits the caprice or cupidity of their customers, are beginning the work at the wrong end. The first step should be to instruct the retailers who come immediately in contact with the public at large, and whose combined influence in the right direction would considerably modify the nature of the demand. It may, in addition, be desirable to provide a summary mode of punishing persons guilty of fraudulent sophistication; but this would have little effect while the root of the evil remains in full force. In France, each Pharmacien has more or less within himself the means of detecting imposition. He has, moreover, a character to sustain, recognized by the State and founded on professional qualification. The self-respect arising from, and corresponding with this position, gives a more healthy tone to the competition, making it an object of ambition rather to excel in quality, than to sacrifice quality to low price.

The Licence in Pharmacy has tended towards this good result in France, because it is granted only to those who have passed the prescribed examination, the nature and extent of the qualification required being under the immediate regulation of the Pharmaciens themselves, who alone are capable of exercising a correct judgment on the subject, and whose proceedings are sanctioned and ratified by the Legislature.

Although a comparison of the state of the pharmaceutical profession in France and in England is in some respects much to the advantage of our neighbours, they are not themselves satisfied, but desire further improvement, which they are endeavouring to attain by means of associations and correspondence with each other. They know very well that in this age of progress "to pause is to be undone." A man who is perfectly satisfied with himself, his quantum of knowledge and a stationary position in his profession, is likely to be left behind, reduced to the fossil state and trampled under foot, or pointed at as a curiosity.

Besides the *Société de Pharmacie* in Paris, which is the grand centre, there are in France about twelve local associations established for the mutual improvement and benefit of the members, and in correspondence with each other. One of the most important of these local associations, namely, the *Société d'émulation et de prévoyance des Pharmaciens de l'est*, held its half-yearly meeting at Lyons on the 9th of September, in a room in the Palais St. Pierre, an institution devoted to science and the arts. M. Viguier, the President, took the chair at twelve o'clock, supported by about sixty members, representing the several towns in the district comprised by the association. The President, in his opening address, took a rapid review of the progress of the association from 1844, when it was projected by five or six Pharmaciens in Vienne, noting the several epochs—1846, '47, '49, and '51—at which it acquired important accessions of numbers, and extension of local influence, until, during the past year (1855), it attained its present complete organization and the full sanction of the government. As an indication of the influence of the Society in promoting improvement, he mentioned several instances of Pharmaciens of the second class having voluntarily qualified, and subjected themselves to an additional examination for the purpose of obtaining a first-class diploma. The attention of the association had also been directed to amendments of the law, and the suppression of the practice of pharmacy by persons not duly licensed. The general objects and advantages of the association, and of others of a similar nature, were briefly but emphatically noticed by the President, whose address was received with much cordiality by the members present. The Secretary then read the minutes and an abstract of correspondence, comprising letters from distant members, expressing regret at their absence, and, in some instances, offering suggestions for the consideration of the Society. Several scientific papers and contributions were also announced.—M. Dorvault read a paper containing an account of some of the proceedings of the *Société de Pharmacie* in Paris, and announced the offer by the Society of a prize for the best essay on the geography of France, considered topographically, pharmaceutically, botanically, &c.—M. Thirault read a *résumé* of the progress of Chemical Science during the past six months, which was followed by a communication from M. Troillet.—The President submitted to the meeting a proposition for increasing the practical influence of the Society, by a regular system of representation among all the Pharmaceutical Associations in France. He proposed that at their future half-yearly meetings, each association should be invited to send a representative, the travelling expenses being paid out of the general fund. If this movement should be reciprocated generally, it would lead to a more effective co-operation and friendly intercourse, and the advantage would be felt, not only in the promotion of scientific improvement, but in case of any laws being proposed or required affecting the interests of Pharmaciens. Unless they took the initiative in these matters, other parties, unacquainted with the capabilities of their profession and the wants of the public, would interfere, and might attempt to pass laws, either obnoxious or practically unsuited to the purpose intended. For example, a law adapted for Paris or Lyons might be quite inapplicable to the rural districts, and the Pharmaciens should so organize themselves by a system of representation throughout the country, that the interests of all parties concerned might be properly considered and protected. The proposed plan would also afford an opportunity for communicating information respecting new medicines, known only in one locality; and it would facilitate the introduction of a tariff of prices, with a view of promoting a more uniform scale of charge in different localities. After a little discussion, the proposal was adopted unanimously, and the Secretary was requested to communicate with the other associations on the subject. M. Breton read a short paper on extract of rhatany, giving the result of some experiments with the addition of a small quantity of sugar, which he found to increase the solubility of the extract and improve its quality. By using a definite quantity (one-fifth), the proportion of extract in a given weight of product was easily estimated. Several other papers were presented, some of which were too voluminous to be read entire at the meeting. A list of corresponding members was read and approved, to which were added the names of two English visitors who were present. The President for the ensuing year was elected by ballot, and the diploma of membership was presented to all the members present, with a silver medal, in commemoration of the establishment of the Society. One side of the medal contains the name of the Association, with the words "*Fondée à Vienne (Isère)* 1847: *Transférée à Lyon* 1855." On the reverse is a group of chemical apparatus, surmounted with the motto "*Concordiâ res parvæ crescunt.*" The meeting terminated at half-past three, and about thirty of the members dined together at four. In the course of the convivialities, which were enlivened with a few impromptus of vocal harmony, and terminated before eight, only one toast was proposed, and it was received with much enthusiasm, namely—"Prosperity to the Society of Pharmaciens of the East, and unity between the Pharmaceutical Societies of France and Great Britain."

PHARMACY IN ITALY.—THE LIMITATION OF THE NUMBER OF SHOPS.—THE SALE OF POISONS.

It is instructive to observe the gradations between free-trade and protection, and the tendency of each of these opposing principles, both with regard to the members of the profession and the profession itself. English Pharmacy may be taken as the type of the free-trade principle, the subject being one of which the Legislature can scarcely be said to take cognizance. The French law interposes some restrictions on the exercise of Pharmacy, to which we have already adverted, but does not interfere with the liberty of the subject, any further than to require proper qualification in the vendors and due precaution in the sale of medicines, with a view of preventing accidents. In Prussia, Austria, Sweden, and some other nations, the principle of protection is carried further, and there is a more direct interference on the part of the Government with the regulations under which Pharmaceutical establishments are opened and conducted.

This is the case in Italy, including the Sardinian States, as well as that portion of the country now comprised in the Austrian dominions; and although under different jurisdiction, the general principles are so similar that it is needless for our present purpose to make a distinction. The Government exercises a direct control and surveillance over the entire medical profession, including Pharmacy. Physicians and Surgeons are strictly prohibited from selling medicines. The number of Pharmaciens in each town or place is limited, according to the ascertained or supposed wants of the population. This limitation is in theory founded on the numerical ratio of one Pharmacien to 5000, but the Government (or the "Minister of the Interior") regulates the matter at discretion. In Milan, for example, the population of which is stated to be 175,000, the number of Pharmaciens is fifty-two. In Genoa, with a population estimated at 144,000, the number of Pharmaciens is twenty-four. Any person desiring to go into business as a Pharmacien must wait until he can meet with an establishment for sale; then the licence of the Government must be obtained, and this is granted only to those who possess a degree in Pharmacy, obtained at some university recognized by the State in which the party is about to carry on business.

The indiscriminate sale of poisons to the public is strictly prohibited, the order of a medical man being required. In the Austrian Pharmacopœia strong medicines, comprising jalap, colocynth, and many others not coming under the class of poisons, are marked with a dagger (†), and any medicine so distinguished in the Pharmacopœia cannot be legally sold without medical authority. This prohibition is interpreted with some degree of latitude in some towns, half an ounce of laudanum, for example, having been obtained by a simple order written in Latin, but not signed; but in other places the signature of a medical man is required, and a prescription containing strong medicine (†) cannot be prepared a second time without fresh authority from the prescriber.

It is needless at present to describe in detail the particulars of the education, which is regulated by the several universities, subject to such general laws as the Government considers sufficient. We are informed that in the Sicilian States the examination is not difficult, but that it is rather more so in the Austrian dominions. The chief source of anxiety to the student has reference to the chance of meeting with a business for disposal, after he has become possessed of his diploma. When this object is attained, the protective principle comes to his aid, limiting the competition, and regulating his charges on such a scale as to yield him an ample percentage of profit. A printed tariff of the medicines in the Austrian Pharmacopœia is published for the guidance of the profession and the public. No discount is allowed to medical men, but all purchasers must pay the stated price. Variations in price, from the fluctuations in the drug market, seldom find their way to the retail tariff, which is usually in force during the circulation of the edition of the Pharmacopœia to which it refers.

The policy of this double kind of protection may be doubtful, but it has its advocates, and some of the French Pharmaciens are desirous of moving in that direction and obtaining the limitation of the number of shops. Judging from the apparent effect of the system so far as we have been able to ascertain it, and viewing the question with reference to the public advantage, the character of the profession, and the interests of the Pharmaciens themselves, we think the evidence is very far from conclusive in its favour. The despotic influence of Austrian legislation, although dulcified by a liberal tariff and a monopoly of business, does not seem to confer on the profession of Pharmacy any additional importance or progressive power. The inappreciable advancement (if any) of chemical or pharmaceutical science in Italy, must be attributable either to the uncongeniality of the soil or to defect in the cultivation—probably in some degree to both. Making allowance for the national temperament, which tends rather towards music than physic, the circumstances under which the Pharmacien is placed are calculated to depress and paralyze more than to develop his energy and talents. By an ordinary amount of attention to his business, a sufficient, although not a very abundant provision for his wants is secured; but no exertions on his part are likely to effect any very material improvement in his position. He is not charged with any public responsibility in the affairs of his profession, and has no influence over the laws under which it is regulated. Whether the law works well or ill, he is neither identified with its merits nor responsible for its defects; and he may almost be regarded as a chattel of the Government, trained and harnessed, and provisioned for the performance of a particular duty according to prescribed rules, but having no more to do with the regulations of his profession than his Imperial Majesty's horses have with the construction of the state coach or the greasing of its wheels.

The result is, as might have been expected, that the Pharmaciens in Italy take very little interest in the laws under which their business is regulated; their course is cut and dried, and they have nothing to do but to follow in the steps of their predecessors, as their successors will follow in theirs when they are gone. There are some among them who are sensible of this disadvantageous position, and who would be glad to unite in any measures that might be calculated to infuse among them some *esprit de corps*, and identify them with the scientific advancement of their profession, but under a despotic government, the organization of an association for such a purpose might be attended with some difficulty. The same obstacle, however, might equally apply to France, but it is obviated by submitting to the approval of the Government the plan and object of any undertaking of this nature, as no association is permitted to be carried on without such sanction.

The practical defects of the system of legislation which we have been considering, appear to be these:—First, the endeavour to bolster up a class of persons by limiting their number, and granting a monopoly to the parties so protected, tends to enervate, by removing the legitimate and most wholesome stimulus to exertion; secondly, the usurpation by the Government of the arbitrary control of the affairs of a profession, is impolitic, as it excludes from a sphere of usefulness those members of the profession who, from their experience, are the most competent persons to uphold its character and promote its advancement.

It is the duty of every Government to protect the public against the pernicious impositions of empirics and other unqualified pretenders to professional skill, by providing the most practicable means of exposure and summary punishment; duly qualified practitioners should also be protected, so far as this can be done, against the fraudulent encroachment of quacks; and, lastly, the members of each profession should be organized as an association for the management of their own internal affairs. The above objects being effected, individual talent, industry, and emulation, should have full scope.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE TREE PRODUCING *RED CINCHONA BARK.*

BY JOHN ELIOT HOWARD, ESQ.

It has long been a desideratum in Quinology to ascertain the botanical origin of this article of the Pharmacopœia which is still so much esteemed, and commands so high a price in the market. I have at length succeeded in obtaining authentic specimens from the place of growth, which will, I trust, tend towards a settlement of the question, although still leaving something to be desired, and to be ascertained by future researches.

Dr. Weddell points out the native locality of this species of Cinchona in his *Voyage dans le Nord de la Bolivie*, published at Paris in 1853. Touching at the Port of Guayaquil, he says:*—

"One of the barks produced by the forests of this region is the *true red bark*, which rivals the best Bolivian bark in the quantity of alkaloids which it contains. The tree which produces this precious bark, and of which I recovered the lost traces in my previous passage by Guayaquil, grows on the western slopes of Assuay, and of Chimborazo, between Chillanes and Guaranda. These geographical data will perhaps assist in deciding the botanical species to which it ought to be ascribed."

It is exactly from this district, and in the region in which, according to Laubert,† "red bark" was first discovered, that I have obtained the specimen tree which I now describe, and of which I received a few weeks since, contained in two chests, the following portions: viz., two pieces of the trunk, three of the large roots, five of the thickest branches, and one small box containing small boughs and leaves placed between paper. The leaves, though injured by imperfect drying, are still very sufficiently characteristic of the species. The collector apologized for not sending the flowers or fruit because the time of year was not favourable. The tree was cut in September, 1855. The account sent was as follows: after enumerating the parts above described, he says:—

"All from the same tree of red bark (*cascarilla roja*), cut in 2° 16′ south latitude and 16′ longitude west of the meridian of Quito, from a mountain called Chahuarpata, near the village of Cibambe, in the province of Alausi, which is one of the spots which produces the best red bark. There are not now large trees to be found, but only a little larger or less than the one sent, which is of middling size. Each piece has attached to it a paper, showing the part of the tree to which it belongs."

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* Page 48.

† "It grows, as we have stated, in the mountains of Riobamba, Cuenca, and Jaen, on very elevated spots, cool at night, and well exposed to the sun, as do all other fine species."—*Laubert's Memoir, &c.*

The trunk of the tree at the lowest part, from which the roots have been cut away, is not more than between two and three feet in circumference, and the branches are from about fourteen to eighteen inches of similar measure. The roots are of proportionate size. The thickness of the bark on branches of four and a-half inches across is not more than one-tenth of an inch. The weight of the bark is about one-twentieth that of the wood. The very large and fine red bark which we sometimes see, and which commands a price of seven or eight shillings per pound, must therefore be procured from trees of great age and size, and these no doubt fall quickly under the axe of the *cascarillero*, thus accounting for the scarcity of the finest samples. The age of the tree has also probably some influence in producing the light spongy texture of those specimens which have the highest colour—the colouring matter amounting in some cases to about one-third the weight of the bark.[*] The bark varies much in different parts of the tree. That on the trunk, and even on the large roots, presents the familiar aspect of commercial red bark with the peculiar brick-red appearance, where the warty excrescences are rubbed or chafed. Near the roots the bark becomes thicker and more corky.

The small branches present the silvery epidermis which we meet with in the small quills. That on the larger branches resembles exactly stouter quills of red bark, and where the outer coat has exfoliated, the derm shows the small pock marks or indentations, which are characteristic of the best commercial quality,[†] to which indeed the tree evidently belongs; and as I have the pleasure of presenting specimens to the Museum of the Pharmaceutical Society, I need not further describe it in this place, except to say that the different portions of the trunk and branches exhibit the variety of coating usually seen in commercial red bark of genuine quality, thus showing that it all proceeds from one tree.

The varying size and form of the leaves may be inferred from the accompanying woodcut. The largest in my possession, a little imperfect at the apex, measures about nine inches in length by six in width. The shape of the leaves is that of *Cinchona ovata*, approaching perhaps more nearly to the variety α *vulgaris* than to the var. β *rufinervis*, in which latter the leaf appears to be somewhat longer in proportion to its width. The red bark leaves, however, instead of being "*subcoriaceous*" (as in the α variety, illustrated by specimens given me by Dr. Weddell), are "*submembranaceous*," thus confirming its connexion with the variety γ *erythroderma*, the bark of which agrees very closely with the sort under consideration.

Of this variety, Dr. Weddell says:[‡]—

"No *Cinchona* (unless it be *C. Condaminea*) is so susceptible of variation through soil and climate as *C. ovata*. It is particularly in the bark that these changes become manifest. * * A single individual of *C. ovata* frequently produces distinct varieties of bark on different sides of the trunk. The periderm is generally (in this species) much thinner on the eastern than on the western side. * * The variations which are to be noticed in the young bark of different individuals are still more striking, particularly in the periderm. * * I at one time thought that the 'true red bark' ought also to be attributed to *Cinchona ovata*,

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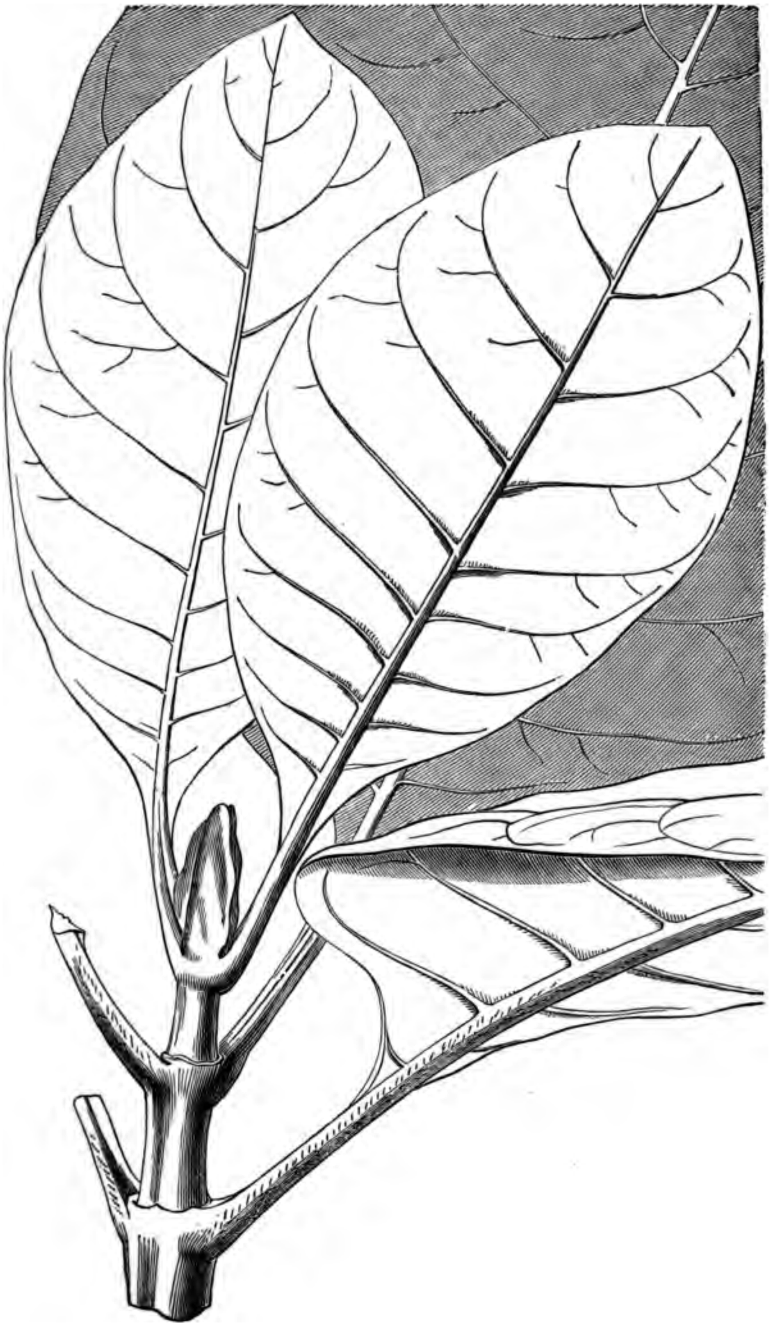
[*] It must be an important question for the physician to decide, whether this large percentage of vegetable matter, of complex chemical constitution, produces a good or a bad result, when received into the stomach of the patient. I am not aware that we have any reliable information as to the medicinal effect of kinovic and cincho-tannic acids. I find the heart-wood of the tree to be rich in kinovic and less so in cincho-tannic acids, forming together rather more than two per cent. of the weight of the wood. The leaves contain a large quantity of chlorophyll, affording an alcoholic solution of a beautiful dark green colour, rich purple by reflected light.

[†] See *Pharm. Journ.*, vol. xi., p. 497. The red bark which came in the same ship, and I think from the same place, was of very good quality, and contained from three to four per cent. of alkaloids, including a fair proportion of quinine.

[‡] *Histoire, &c.*, page 62.



Tree producing *Red Cinchona Bark.*

but, in looking at the specimens which M. Guibourt has shown me, I have been obliged to suspend my judgment. The barks on which I founded this opinion were gathered in the valleys north of Cusco, and as the tree which produces them presents at the same time some differences in the leaves, I have made it into a separate variety, giving it the name *erythroderma*, which recals its most interesting character."

This seems to have been a most felicitous designation thus conferred by anticipation by this excellent botanist, who has done so much to illustrate the history of this invaluable genus. This variety will in future be, in all probability, regarded as affording *the true red bark of commerce*, of which it is well known there is but one sort which passes current and obtains a high price, whilst other samples (however *red* in appearance), which proceed from *C. micrantha*, var. *rotundifolia*,* or from *C. scrobiculata*,* or *C. pubescens*, or even from a variety of *C. lancifolia*, are not at all received as "red bark," but are regarded as "spurious," and the price is low in proportion.

I cannot, therefore, agree in the view that commercial red bark is the produce of a variety of trees. On the other hand, I am glad to agree fully with the opinion of M. Guibourt, as given in his *Histoire Naturelle des Drogues Simples*, that the *Quinquina rouge vrai non verruqueux* (viz., that of the branches,) and the *quinquina rouge verruqueux* (that of the trunk and roots), constitute together the true red bark of commerce.

M. Guibourt adds (and I think his observations are very important, as determining the next question which presents itself to our view):—

> "I have shown before how this bark has been, *according to the false indications of Mutis*, attributed to the *Cinchona oblongifolia*. This error was only discovered when Humboldt had brought into Europe the pretended 'red bark' of Mutis, or the bark of *Cinchona oblongifolia*. The error was first discovered in Germany by Schrader and De Bergen, who found that the *red bark of Mutis*, or the bark of *C. oblongifolia*, was that which bore in Europe the name of *Quinquina nova*. To the irresistible proofs which these two authors have given I will add—1. That the red bark of Mutis deposited by Humboldt in the Museum of Natural History at Paris, is *nothing else but Quinquina nova*. 2nd. That three samples examined by Vauquelin under the following denominations: No. 2, *Quinquina de Santa Fé*; No. 10, *Cinchona magnifolia*; No. 16, *Quinquina rouge de Santa Fé*; were *Quinquina nova*, shown to be such by the characters of the bark and by the chemical qualities of the macerating liquors. Thus nothing is better proved than this fact, that the *Cinchona oblongifolia* or *magnifolia* produces the *Quinquina nova* and not the *true red bark*."

It must therefore be fully admitted that *Cinchona oblongifolia* (*Cascarilla magnifolia*, Weddell) is not the source of commercial red bark, but only of the worthless *Quina nova*, a bark which has been sold at an extremely low price to the tanners, though I never heard that they profited by the bargain. However frequently this name may be repeated by the old Pharmacopœias, no druggist who regards his character would venture to sell the bark of *Cinchona oblongifolia* of Mutis as having any value in medicine.

It is true that Messrs. Delondre and Bouchardat, in their recently published *Quinologie*, have given forth as their opinion that the "red bark of Mutis" was none other than what is usually considered to be the red variety of the *lancifolia-bark* of New Granada. It is not improbable that these might enter into the composition of the immense cuttings of coarse red barks ("cortezones roxos"), which it appears† that Mutis sent over to Spain, since it was doubtless then, as now, too frequently the practice to cut any tree that resembled that which they were seeking,‡ and to intermingle the products; but this does not disprove the testimony, which appears to me conclusive, that the *Cinchona*

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* These two sorts illustrated by samples gathered by Dr. Weddell.

† See *Pharm. Journal*, vol. xii., page 340.

‡ "Se substituen en su logar las cortezas del arbol que se encontraa mas parecido."—*Suplemento de la Quinologia*, page 36.

oblongifolia of Mutis (furnishing the *Quina nova*, which I have described in a previous volume[*]) was that which this botanist relied upon to compete with the genuine red bark of Quito. He was determined that New Granada should supply *its red bark*, and since the country did not furnish the article, he fixed upon a sort which externally bore some resemblance, and made a powder of a similar colour, and to which it is but just to Mutis to say, that he only ascribes an[†] "*indirectly* febrifugal" power.

I think that I have thus sufficiently shown that the old venerable name of *Cinchona oblongifolia* may be safely disposed of. In the next place, in order to give some greater certainty in this attempted identification with the new term, I must mention that I wrote to Dr. Weddell, and also transmitted to him some of the leaves. He says (under date August 2nd) in reference to "Quinology:" "You have evidently solved one of its most interesting desiderata," and (under date August 12th, having received the leaves) he adds, "the leaves I find in a better state of preservation than I might have expected from your account. *They undoubtedly appear to correspond exactly to what you infer as to their botanical origin.*"

I have thus given all that it is in my power to afford at present for the direct elucidation of this question. It remains that I add one or two indirect but confirmatory notices. First, as to the *Cinchona colorada de Huaranda* proceeding from a species called by Pavon *Cinchona succirubra*, and which I have described in vol. xi., p. 497 of this Journal as commercial red bark. In the course of last year I found, at Kew, Ruiz and Pavon's botanical specimen of this, and it proves to be also a *Cinchona ovata*, akin in the sub-membranaceous character of the leaves, to those which I have since received direct.

In reference to this specimen, Dr. Weddell remarks in the *Bulletin de la Société Botanique de France*, tome ii., p. 438:—

"It seems to me now demonstrated that the tree to which I applied in my *Histoire des Quinquinas* the name which I have mentioned, is really that which produces the officinal red bark. My hypothesis is confirmed by an interesting discovery made quite recently by Mr. Howard, in the herbarium of Sir W. Hooker. It is that of a flowering specimen of *Cinchona*, bearing in the handwriting of Pavon the provincial name which is now generally known to be that of 'red bark,' *Cascarilla colorada de Huaranda*.

"Mr. Howard having obligingly communicated to me the figure which he had

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[*] See *Pharm. Journal*, vol. xii., page 340.

[†] I extract from the *Suplemento de la Quinologia*, page 109, the following information from the pen of Dr. Mutis, which is stated to be the only *botanical* description of the barks of New Granada which he published. As the authority of Dr. Mutis has been very prevalent, it is well to give the quotation in its original language and form, that it may lose nothing of its importance by translation:—"The following is the statement of the number and properties of the officinal barks inserted by Dr. Mutis in the periodicals of Santa Fé:—

En la Botanica—*Cinchona*.			
Lancifolia	Oblongifolia	Cordifolia	Ovalifolia
Quina.			
Hoja de lanza	Hoja oblonga	Hoja de corazon	Hoja oval
En el Comercio.			
Naranjada primitiva	Roxa sucedanea	Amarilla substituida	Blanca forastera
En la Medicina:		*Amargo*	
aromatico	austero	puro	acerbo
balsamica	astringente	acibarada	xabonosa
antipyrectica	antiseptica	cathartica	rhyptica
antidoto	polycresta	ephractica	prophilactica
nervina	muscular	humoral	visceral
Febrifuga		*Indirectamente febrifugas.*"	

This enumeration of qualities for the bark of the oblongifolia clearly points to the *Quina nova*, as his recognized *red bark*.

The bark of the lancifolia is alone admitted to be directly a febrifuge.

That of the ovalifolia can only act through the kinovic acid it contains. Is this inert, or has it any action on the human system?

caused to be drawn of this specimen, I had no difficulty in seeing in it the image of my *C. erythroderma.* It is true that the differences* which I mentioned between the bark of my tree and that which is commonly met with in commerce exist still as before, but I have found intermediate forms which so perfectly connect these two types, that there no longer exists in my mind any doubt concerning their identity.

"There may be a doubt, on the contrary, as to the rank which should be attributed to the plant which produces them. Should it still be attached to *Cinchona ovata* as a variety, or should it be raised to the rank of a species ? It is a point which can scarcely be finally decided until we know its fruits. Whatever it may be, the discovery made by our colleague Mr. Howard, of a flowering branch of the *Q. de Huaranda*, has certainly made a great step towards the solution of the problem, and has appeared to me worthy the attention of the Society."

I may add, in reference to the piece of the bark of *C. erythroderma* (*C. ovata* var. γ *erythroderma*) given me by Dr. Weddell, that it agrees in minute particulars with that of commercial red bark. The colour of the denuded derm, the indentations upon this, and the impression of a cross crack, forming a ring at distant intervals, also the character of the periderm,—all these correspond; but the colour is not fully equal to that of the *finest* red bark, and it is perhaps rather more dense and woody; but even the bark of the branch and trunk of the same tree vary in these particulars.

The Huaranda bark in the British Museum, which both M. Guibourt and myself regard as genuine "red bark," has also peculiarities such as might mark a tree grown in a less favourable soil. The leaves and small branches of my red bark tree give the impression of luxuriant vegetation. That of Pavon's specimen, on the contrary, tells of rather stunted growth. But such variations must be expected in a tree growing in localities so distant from one another.

The last particular which appears to me confirmatory of the correctness of this botanical derivation, is the very close analogy which exists between the "red bark" and that which is called in commerce "*Carabaya bark*," and which, according to Dr. Weddell, also proceeds from a variety of *C. ovata.* This struck me long ago, and would occur to any person who will take the trouble to compare the two sorts; but it is not a matter susceptible of demonstration, and I will not dwell upon it.

It is to be hoped that the remaining links of this chain of investigation will shortly be added, through our being put into possession of the flowers and fruit, as well as a further supply of the leaves of this interesting tree; and that these will afford materials for completely determining whether it coincides with Dr. Weddell's *Cinchona ovata,* var. γ *erythroderma;* and whether, if such be the case, that plant ought to be raised to the rank of a species.

DETERMINATION OF THE AMOUNT OF THÉINE IN GUARANA.

BY JOHN STENHOUSE, LL.D., F.R.S.

GUARANA, as is well known, is a species of chocolate, manufactured from the fruit of the Paullinia Sorbilis, by the aboriginal tribes of Para, and other districts in Brazil, and extensively employed by them both as a refreshing beverage, and as a remedy against dysentery and similar diseases.

The presence of théine in guarana was first discovered many years ago by Dr. Theodore Martius, of Erlangen, and his observations were subsequently corroborated by Messrs. Berthemot, Dechastelus, and C. Jobst.

As none of these gentlemen, however, made any determination of the amount of théine in guarana, I thought it might be of some interest to supply the omission, especially as I had previously determined the quantity of théine present in all the other substances known to contain that alkaloid. Through the kindness of my friend John Miers, Esq., F.R.S., the well-known Brazilian traveller, I have recently been enabled to subject guarana to a new examination.

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* "The texture of my bark is more woody than that of the typical red bark."

The specimen of guarana, given me by Mr. Miers, was about seven and a-half inches long, one and a-quarter inches thick, and weighed nearly three-quarters of a pound. It had a rough corrugated surface, dark brown colour, no odour, and a somewhat amygdaloidal fracture.

Twenty-five grammes of the specimen were very finely powdered, and boiled with one quart of distilled water for some time. When cold, a slight excess of basic acetate of lead was added, when a bulky brownish-red precipitate fell. This was repeatedly digested with hot water, and the clear liquid which passed through the filter was treated with a slight excess of sulphuretted hydrogen, till all the lead present in it was precipitated. The clear solution was then evaporated to dryness on the water-bath, and the residue dissolved in a small quantity of boiling alcohol and filtered. The filtrate was allowed to evaporate nearly to dryness, when yellowish-coloured crystals were deposited. These were pressed between folds of bibulous paper and recrystallized out of spirits of wine, when they were rendered perfectly colourless. After being dried on the water-bath, they were weighed, when the twenty-five grammes gave 1.260 grammes, equal to 5.04 per cent.

A second determination, in which fourteen grammes were used, gave 0.715 grammes, equal to 5.1 per cent.

Average of the two determinations, 5.07 per cent.

In addition to théine, guarana contains a colouring matter, apparently analogous to the tannin in cinchona bark, and likewise a fatty matter which, like the fat of chocolate, does not appear to become rancid by keeping.

From an inspection of the subjoined table, it will be seen that guarana is the richest known source of théine:—

	Per cent. of Théine.
Guarana	5.07
Good Black Tea	2.13
Black Tea from Kemaon, E. I.	1.97
Various samples of Coffee Beans, from 0.8 to	1.00
Dried Coffee Leaves, from Sumatra	1.26
Paraguay Tea, from Ilex Paraguayensis	1.2

NOTE UPON A GREEN DYE FROM CHINA.

BY DANIEL HANBURY.

Some weeks since a merchant showed me a small sample of a new dye, said to have been imported into Marseilles from China, and to be recommended for dyeing silk. From its dark blue colour I conjectured it might be a sort of indigo, such as the Chinese are stated to prepare from *Isatis tinctoria* L. and from *Polygonum tinctorium* Lour., but I had no opportunity of determining whether it was indigo, by any chemical examination.

Very recently, however, a larger sample of the same dye and a piece of cotton cloth dyed green with it, have been sent to me by my friend William Lockhart, Esq., of Shanghae. They were accompanied by a communication as to the manufacture of the dye upon the authority of the Rev. J. Edkins, the substance of which is given below.

I may add that Mr. Lockhart forwarded to me in the early part of this year, stems of the cultivated tree called *Lŭh-chae*, being one of those from whose bark the dye is manufactured, but no specimens from which its botanical characters could be ascertained.

The dye, which is known as a *green* dye and called *Lŭh-kaou*, consists of a dry paste, in small irregular fragments scarcely thicker than stout paper. Its colour is an intense blue-black, with a little of the coppery lustre seen upon indigo. Rubbed upon paper with a moistened ivory knife, it developes a greenish-blue of considerable brilliancy. It is insoluble in water, rectified spirit, or ether, whether cold or hot. With fixed alkalis, however, a solution of an intense green colour is obtained. A solution prepared by boiling ten parts of the dye with three parts of carbonate of potash (KO, CO_2) has a brilliant bluish-green, and possesses the following characters. The addition of an acid occasions no precipitate. Solution of hypo-chlorite of soda (*Liquor sodæ chlorinatæ* P. L.), very sparingly added, changes the green to blue, which speedily passes to purple and then to pink; a large addition of the reagent destroying the colour completely. Solution of iodine produces the same changes from green to pink. Sulphurous acid alters the green to a yellowish-brown. Hydrochloric acid occasions no change in a solution of the dye; nitric acid renders it brown.

This brief and superficial examination is almost all that my small stock of the dye has permitted, but upon the arrival of a larger quantity, I trust a complete investigation will be made.

The following is the substance of the information before alluded to, as obtained by the Rev. J. Edkins.

The bark of two kinds of the tree called 綠柴 *Lŭh-chae,* literally *Green-shrub*, one kind growing wild, which is known as the *white*, and another, which is cultivated, and called the *yellow*, are used to obtain the dye. The *white*, or wild *Lŭh-chae*, grows abundantly in the neighbourhood of Kea-hing and Ningpo. The *yellow* is produced at Tsŏh-kow-pang, where about thirty men are employed in the manufacture of the dye. This place is two or three miles west of Wang-teen, a town a few miles to the south of Kea-hing. The dye is also prepared in Hoonan and at Ningpo, but not so good.

The process is as follows:—The two barks are placed together in iron pans and thoroughly boiled in water. The decoction is left undisturbed for three days, after which it is placed in large earthenware vessels, and cotton cloth prepared with lime is dyed with it several times. After five or six immersions, the colouring matter is washed from the cloth with water, and placed in iron pans to be again boiled. The colouring matter is taken up on cotton yarn [by dipping] several times in succession; it is then washed off and sprinkled on thin paper; when half dry, the paper is pasted on light screens and thoroughly exposed to the sun. The product is called 綠膠 *Lŭh-kaou.* In dying cotton cloth with it, ten parts are mixed with three parts of subcarbonate of potash in boiling water.

It is not used to dye silk on account of the expense, since it is only a rough surface that takes it easily, and to colour silk, so much of the material must be used, that it would not pay. All cotton fabrics, also grass-cloths, take the colour readily. The dye does not fade with washing, which gives it a superiority over other greens. It has long been used by painters in water-colours, but the application of it to dye cloth was first made only twenty years ago. If some method could be discovered of applying it to silk fabrics, it would become still more useful.

The dye is sent from Kea-hing as far as Shantung.

ON UNGUENTUM HYDRARGYRI.

BY JOHN HIGGINBOTTOM, F.R.S, F.R.C.S.

I SENT a communication to the *Medical Repository* for July, 1814, "On a new mode of preparing the strong Mercurial Ointment," which was as follows:—" Take six ounces of quicksilver and put it into a proper sized mortar, with two ounces of the strong mercurial ointment; rub them briskly together; the globules of the quicksilver will disappear in two or three minutes, and by continuing to rub it well for five or six minutes longer, the union will be so far accomplished that the lard may be gradually added. By this simple process a pound of ointment may be well made in ten or twelve minutes, which, according to the usual method, requires as many hours.

"*N.B.* It is not necessary to use *old or rancid strong mercurial ointment* in making the preparation."

Since my first communication I have had several inquiries respecting the mode of preparing the ointment; on that account, and as it does not appear to be generally known, although I published the fact forty-two years ago, I thought it proper to send a paper to the *Pharmaceutical Journal*, especially as some little improvements have occurred to me since that period.

Several years ago I found on mixing equal parts of the strong mercurial ointment and quicksilver together that the union was even more readily effected.

I have had lately an inquiry by letter from a Chemist, who requested to know "whether six pounds of the quicksilver would unite with two pounds of the strong mercurial ointment." I have been informed by a friend who is a Chemist that the union cannot be readily effected as the quantity of ointment is not sufficient to suspend the large quantity of quicksilver; but that the difficulty is easily removed by preparing in the manner last directed, *i. e.*, by mixing six pounds of the strong mercurial ointment with six pounds of the quicksilver.

The lard may be gradually added to make either the strong or the mild ointment.

Nottingham, 15th Sept., 1856.

REPORT OF THE

RESULTS OF PHYSICAL AND CHEMICAL INVESTIGATION,

AND OF THE

APPLICATIONS OF PHYSICS AND CHEMISTRY IN THE ARTS.

BY B. H. PAUL, Ph.D., F.C.S.

Production of High Temperatures.—M. Deville* has devised an apparatus for this purpose, which he calls a "lamp-forge," represented on a scale of one-fifth its size by fig. 1. The burner, *K K*, is a hollow ring of thick sheet copper, closed at

FIG 2

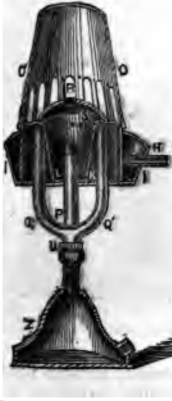
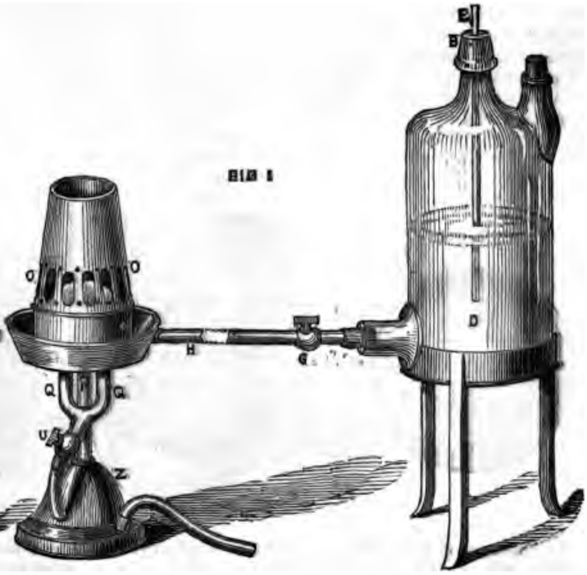


FIG 1



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* *Ann. de Chim. et de Physique*, xlvi. 182.

the bottom, as shown in the section, fig. 2, by a copper plate, *I I*, turned up at the edges, so as to form a circular trough round the burner. The inner side, *L*, of the annular burner is slanting, and pierced near the upper edge, S, with eight holes, from $\frac{12}{100}$ to $\frac{16}{100}$ of an inch diameter. The burner is covered with a detached copper cupola, R, resting in a groove at the top, and having a hole $\frac{8}{10}$ of an inch diameter. Over the whole is placed a conical chimney, *O O*, three inches high, and perforated at the lower part. *Z* is an air reservoir, connected with a bellows, capable of producing a blast equal to a pressure of two or three inches of mercury, and connected with the burner by the tube *P*, on the top of which an air jet is screwed, so that the aperture, $\frac{8}{100}$ of an inch diameter, is $\frac{2}{10}$ of an inch below the level of the holes, *S*. Both ends of the tube, *Q Q*, pass through the plate, *I I*, extending to the top of the annular space, *K K*, and by means of the stop-cock, *U*, the communication between it and the reservoir may be made or cut off at pleasure. The tube, *H*, connects the burner with a bottle containing turpentine, in which a constant level is maintained by means of the tube, *E D*, which must be exactly $\frac{2}{10}$ of an inch below the level of the holes, *S*, otherwise the turpentine might run out or take fire in the annular space, *K K*, which would be inconvenient, though not attended with any danger. When the apparatus is to be used, the stop-cock, G, is opened, and closed again as soon as the turpentine has come to the same level in *K K* and *D*. Water is then poured into the trough, *I I*, and boiled by means of a spirit-lamp for some time, until the turpentine in the annular space, K K, has a temperature of 212°. A blast is set up through the tube, *P*, the stop-cock, *U*, partially opened, and the turpentine vapour issuing from the holes, *S*, lighted at *O O*. When the vapour has been lighted, and burns without flickering, the stop-cock, *U*, is opened gradually, the blast increased until the full degree of heat has been produced, and, a few minutes after lighting the vapour, the stop-cock, *G*, is opened. Then, by maintaining the blast, the temperature may be kept up as long as may be required. In order to put out the flame, the stop-cock *U* is closed, and then *G*.

The current of air from the tubes *Q Q*, passing over the surface of the turpentine, at 212° F. in the annular space, *K K*, carries with it turpentine vapour, and the mixture escapes through the holes *S*, but does not burn until it comes in contact with the air forced through the jet *P*. When the temperature of the turpentine is below 212° F., it may take fire in the space *K K*, but after it has once been heated sufficiently this does not happen, because the tension of the turpentine vapour at 212° F. is so great, that air saturated with it will not take fire without a further supply of oxygen. After the apparatus has been set in work, sufficient heat is generated to keep the turpentine hot, and then the water in the trough serves only to prevent too great an increase of temperature.

Another arrangement, devised by M. Deville, for producing very high temperatures, is represented by fig. 3, on a scale of one-eighth its size.

FIG. 4

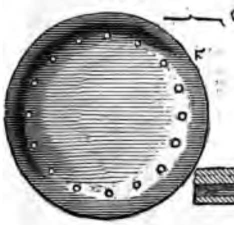


FIG 3

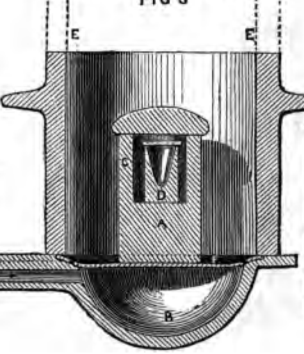
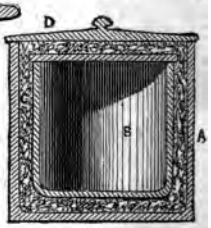


FIG 5



It consists of a baked clay cylinder, *E E*, seven inches diameter, resting upon a disc, *F F*, of cast-iron, perforated with holes $\frac{2}{10}$ of an inch diameter, as shown by fig. 4, and underneath this a basin-shaped vessel, *B*, connected by means of the tube *C*, with a powerful bellows. As fuel, cinders, well separated from ash and clinker, are used, in fragments the size of hazel nuts. Gas coke does not produce so high a temperature as cinders. The crucible is placed in the cylinder *E*, surrounded by ignited charcoal, to a height of two or three inches, and the remaining space filled with the cinders. A blast is then set up, and gradually increased, the fuel being pushed down meanwhile by means of an iron rod, and the cylinder kept quite full until the temperature is raised to the required degree, and then the blast is kept up until the whole of the fuel is burnt. During the whole time, the fuel at the top remains quite cold, and the highest temperature is produced in a zone about one inch above the plate *F*, and extending upwards about three inches. Above this zone the temperature decreases rapidly, in consequence of the conversion of carbonic acid into carbonic oxide, which burns with a flame six feet long. The principle upon which this furnace is constructed is that of rendering the surface of the fuel as great as possible, and producing the greatest heat in a zone that is very broad in proportion to its height.

The crucibles used in this furnace are made of lime, carbon, or alumina. Lime crucibles are made from well-burnt, slightly hydraulic lime, cut into pieces three or four inches wide, five or six inches high, and hollowed out. When a very intense heat is not required, a second crucible, *D*, may be placed inside the other (fig. 3); each is covered with a lid made from lime, and the bottom of the inner crucible should be two inches thick. When the substance to be melted requires a very intense heat, only one crucible should be used, and the cavity should not be more than one inch diameter, and two inches deep. In using lime crucibles, care must be taken to raise the temperature so gradually that they are not cracked, and it is advisable to bring them to a red heat before putting in the cinders.

Carbon crucibles are made from the carbon of gas retorts upon a lathe; they should be cylindrical, and never more than four inches high. When it is necessary to purify one of these crucibles, it is placed in an earthen crucible with a hole in the bottom, through which a porcelain tube passes, and is luted with fire-clay. The crucibles are then heated to redness, and a stream of chlorine passed through the tube. By this means the carbon is purified from sulphur, iron, silica, and alumina. When used, the carbon crucibles are placed in a lime crucible, or in an earthen crucible, *A*, fig. 5, with the intermediate space filled with alumina, that has been previously heated to whiteness, tightly pressed down.

Alumina crucibles are made from a mixture of alumina, obtained by igniting ammonia alum at the lowest temperature possible, with alumina that has been heated to whiteness for a long time. The mixture is made into a paste with water, kneaded into shape, dried, and burnt. The alumina may also be made into crucibles by means of a mixture of equal parts of alumina and marble, both powdered and intensely heated in a wind furnace. The mass then appears translucent, and when powdered, serves well for mixing with twice its weight of alumina, for making crucibles that are not to be exposed to the highest temperatures.

The following examples will serve to illustrate the temperatures that may be produced by means of this furnace :—

Platinum was melted in a lime crucible to a button, and even volatilized in such a quantity that it appeared to have boiled. The metal after fusion is very malleable, and is not porous, as is the case with platinum vessels made by welding the sponge. The foil hammered out of melted platinum does not condense gases or effect the combination of hydrogen with oxygen.

Red oxide of manganese, mixed with carbon, from sugar, insufficient for complete oxidation, was reduced in a lime crucible, and the metal melted into a single button. It had a reddish colour like bismuth, and although very hard, breaks as easily as that metal. The powder decomposes water at a temperature little above 60° F.

Chromium was obtained by heating the oxide with a quantity of carbon insufficient for complete reduction. The metal was melted, but not run into a single button, although the temperature was sufficiently high to volatilize platinum. Chromium cuts glass like a diamond, and might be used for this purpose if it were less brittle. It appears to have about the same hardness as corundum. At the ordinary temperature, the metal is acted upon very readily by hydrochloric acid, very slightly by dilute sulphuric acid, and is not at all affected by nitric acid.

Nickel was obtained from the oxalate in the same way as manganese. It melted to a button. This metal is very ductile, and has greater tenacity than iron. Analysis showed that it contained 0.3 per cent. silicium, and 0.1 per cent. copper.

Cobalt was obtained in the same manner as nickel. It is quite as ductile as nickel, and has nearly twice the tenacity of that metal.

Silica was melted in a graphite crucible and in a coke crucible, but it was not rendered perfectly liquid.

Production of Cyanogen Compounds.—Hr. Brunnquell* has published the results of a very full investigation of this subject, together with remarks on the defects and possible improvements of the method generally adopted. The first point which he considers, is the reason of the small product obtained, in proportion both to the animal substance and the potash used. He dissents, however, from the opinion that this product is less, as regards the animal substance, than might be expected on theoretical grounds, and considers this opinion to be based upon a false assumption that, by the method now adopted, the whole of the nitrogen may be converted into cyanogen. The product obtained from uncarbonized animal substances averages 10 per cent., according to the best authorities. The product obtained from carbonized animal substances appears to be somewhat smaller, although in practice the difference may not be essential. Theoretically, the production of cyanogen is held to consist in the combination of carbon and nitrogen, under the determining influence of the potassium, liberated in the first instance by the reaction of the charcoal and potash. But this reduction of potassium would be effected only at a temperature so high as to carry the carbonization of the animal substance much further than is requisite. Prof. Liebig† has indeed pointed out that the reaction of ammonia with carbon, at a red heat, is another source of the formation of cyanogen, which must undoubtedly be admitted to take place in the fabrication of ferrocyanide. But the facts that this conversion is incomplete under the most favourable circumstances, and that the evolution of gases, upon adding the animal substance to the melted potash, is copious and rapid, are sufficient to justify the opinion that the product arising from this mode of formation can be scarcely sufficient to compensate for loss resulting from other circumstances, such as the conversion of cyanide of potassium into cyanate of potash, sulphocyanide of potassium, &c., which are recognized by theory. Therefore, assuming that this additional product is equivalent to the loss, the practical result is, that of the nitrogen contained in raw animal substances, that portion only is available for the production of cyanogen which remains after carbonization, and the amount of ferrocyanide obtained in practice corresponds with what this might be expected, upon theoretical grounds, to yield. Taking the average amount of nitrogen in the raw animal substances as 12 per cent. and in the carbonized substance as 5.5 per cent., the amount of nitrogen remaining after carbonization, and available for production of cyanogen, will be only 1.83 per cent. of the raw material, since this yields only one-third charcoal, and the loss of nitrogen will amount to 10.17 per cent. Then, if 10 per cent. ferrocyanide is the average product, this must be ascribed either to the use of very nitrogenous substances, or to the production, by good management of the melting operation, of more cyanogen from ammonia, than is equal to the loss resulting from alteration of the cyanide.

For the production of 10 parts ferrocyanide, only 6.53 parts carbonate of soda are requisite according to theory, but, in practice, it is necessary, in order to render the "metal" sufficiently fusible, to use, for uncarbonized substances, about an equal quantity, or 12.5 times as much; for carbonized material, about one and a half times its weight. There is in this respect an advantage in the use of carbonized material, because it represents three times as much in the uncarbonized state. Attention has not been sufficiently directed to this defect of the method now adopted. There is, moreover, an actual loss of potash, over and above that attending all kinds of operations on the large scale, arising from formation of silicate of potash, volatilization of potash or potassium, and from the crystallization of the adventitious salts of the potash with the ferrocyanide. Taking the actual loss of potash as 25 per cent., and considering the cost of recovering potash from the mother-liquors, together with the further loss of 5 per cent. in this operation, and the respective value of animal material and potash, it appears that the small percentage product in reference to the potash is a far greater defect of the method than the waste of nitrogen. As a result of these considerations, Hr. Brunnquell comes to the conclusion that the method of production is in itself defective, and that a better result is to be obtained only by the adoption of some more appropriate chemical process.

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* *Verhandlungen des Vereins zur Beförderung des Gewerbfleisses in Preussen*, 1856, p. 20.

† *Annalen der Chemie und Pharmacie*, xxxviii., 20.

In the reaction of melted alkaline carbonates with nitrogenous organic substances, the carbonate of potash that is not consumed in the production of cyanide or volatilized, passes for the most part, together with the chloride, silicate, and phosphate, into the mother-liquors; a smaller portion remains with the carbonaceous residue. Sulphate of potash is chiefly reduced to sulphide of potassium, in part giving rise to the formation of sulphocyanide and sulphide of iron, in part passing into the mother-liquors. The animal substances, when projected into the melted potash, evolve carburetted hydrogen, carbonic oxide, carbonic acid, water vapour; the residual carbon, reacting with the potash, gives off carbonic oxide chiefly. The mineral constituents of the animal substances in part remain with the carbonaceous residue, in part pass into the mother-liquors. The calcined residue from the mother-liquor of potash (containing 75.6 per cent. KO, CO_2) that had been used once was found to contain—

Carbonate of potash	71.9
Silicate	11.9
Sulphide of potassium	4.3
Substance insoluble in water	1.6
Water	2.1
	92.3

together with small amounts of chloride and sulphocyanide of potassium, phosphate and sulphate of potash. The small relative loss of potash is accounted for by the circumstance that in using the potash the first time the greater part of the adventitious salts are separated in the crystallization, and the water is removed for the most part. The absolute loss is much greater, for the calcined residue of the mother-liquor does not amount to more than 60 per cent. of the potash used. The mother-liquor generally contains a considerable amount of bicarbonate or sesquicarbonate of potash, originating from the decomposition of cyanate of potash while the solution is boiled, and as was shown by Hr. Graeger,[*] a peculiar double salt ($2\ NaO, CO_2+KO, CO_2$) that crystallizes readily. Hr. Brunnquell was unable to recognize the presence of caustic potash, although its formation in "metal," containing very little cyanate, may be accounted for by the action of earthy bases, and by the partial reduction of carbonate of potash ($KO, CO_2+C=KO+2\ CO$).

The dry carbonaceous residue consists of 15.5 per cent. carbon almost free from nitrogen, 84.5 inorganic constituents. When by exposure to the air the sulphide of iron is oxidized, and reacts with the silicate of potash, sulphate of potash is frequently produced in sufficient amount to be worth extracting.

The valuable cyanogen compounds are cyanide and ferrocyanide of potassium. Hr. Brunnquell adopts the opinion held by Prof. Liebig, that the "metal" contains only cyanide of potassium, which is not converted into ferrocyanide until heated with water; but, although admitting the experiments of Hr. Reiman[†] furnish strong evidence in favour of this view, he considers the method adopted by Prof. Liebig and Hr. Runge, of treating the "metal" with alcohol of five per cent., is not adapted to decide the question between them, because ferrocyanide of potassium dissolves to the extent of 2.1 per cent. even in alcohol of fifty per cent., so that by exhausting the "metal" by means of alcohol, ferrocyanide might be mistaken for cyanide, while on the other hand, by treating the "metal" only once with a small quantity of alcohol, a concentrated solution of carbonate of potash is formed with the water extracted from the alcohol, which is rendered so strong as barely to dissolve cyanide of potassium. Moreover, it is questionable whether the water in alcohol of fifty per cent. would not be sufficient to determine the conversion of cyanide into ferrocyanide. But, considering that ferrocyanide of potassium is decomposed at a red heat; that cyanide of potassium may be melted in iron crucibles without acting upon them, and that cyanide of potassium is formed by melting ferrocyanide of potassium with carbonate of potash, it appears highly probable, that although ferrocyanide might be formed in small amount during the melting, it would be converted into cyanide and cyanate.

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[*] *Polytechnisches Journal*, xcvi., 174.

[†] *Pharmaceutical Journal*, xiii., 432.

With regard to the question whether the cyanide of potassium in the "metal" is, in the subsequent stages of the operation, for the most part converted into ferrocyanide, or whether valueless compounds are not formed, Hr. Brunnquell is of opinion that this depends upon the mode of treatment adopted. He has found that the sulphide of iron is better adapted for this purpose than any other iron compound, and as Liebig has shown that the "metal" always contains the readily fusible compound ($2\,KS + FeS$), and the melting vessel is always coated with a thin layer of sulphide of iron, which is dissolved, and a fresh layer formed, the cyanide is sure to be converted into ferrocyanide, which does not undergo decomposition afterwards, even when the solution is boiled, as shown by Gentele.*

Of the worthless cyanogen compounds, cyanate of potash is formed by the action of air upon the cyanide, and by other processes, thus: $KO\,SO_3 + 2\,KCy = KS + 2\,KO\,CyO$. It is probable also, that at very high temperatures, the cyanogen of cyanide of potassium reduces the carbonate of potash. Sulphocyanide of potassium owes its formation principally to the presence of sulphur in the animal substance, hydrosulphocyanic acid or sulphocyanide of ammonium being formed during the carbonization, and afterwards converted into sulphocyanide of potassium by contact with the potash. Hr. Brunnquell does not think the sulphocyanogen arises only from the sulphur of the potash, because it would be difficult otherwise to explain why all the sulphide of potassium is not converted into sulphocyanide, as there is an excess of cyanide. But this argument is not conclusive; because sulphocyanide of potassium may be converted into sulphide of potassium by reaction with iron, and the cyanogen of sulphocyanide may, by means of this reaction, be turned to account. If this reaction takes place to sufficient extent, the formation of sulphocyanide may be an advantageous feature of the process; so that there would not be any advantage in the use of potash free from sulphate. When sulphocyanide of potassium is melted with iron, and the mass covered with water, ferrocyanide of potassium is dissolved, and, within an hour, the liquid does not contain any cyanide of potassium. The conversion of cyanide of potassium into ferrocyanide, by means of sulphide of iron, obtained in the wet way, does not take place so rapidly, and, therefore, it is probable that, in the above instance, there may be formed a double compound of sulphocyanide of potassium with sulphide of iron, which is immediately converted into ferrocyanide by the action of water.

Hr. Habich† is also of opinion that the sulphocyanide of potassium in the "metal" originates from the sulphur of the organic substances, but recommends separating the sulphides by means of carbonate of iron, from the potash used, because cyanide of potassium is not formed by melting sulphide of potassium with nitrogenous organic substances.

The following analysis of a mixture of "metal," obtained from various materials in ten separate operations, will show the possible extent of the loss arising from the formation of these two substances :—

Cyanide of potassium	7.58=	Ferrocyanide of potassium	8.20	product
Carbonate of potash (and soda) ...	57.56			
Sulphocyanide of potassium.........	3.33=	Ferrocyanide of potassium	3.26	loss
Cyanate of potash	2.46=		2.53	
Sulphate of potash	2.82			
Silica	3.10			
Substance insoluble in water	18.11			
Chloride, sulphide, and phosphate	.5.04			
	100.00			

The ferrocyanide was estimated by means of a solution of persalt of iron.‡ The sulphocyanide was estimated by converting it into sulphate, by means of nitric acid, after separating sulphide from the solution of the "metal" by means of carbonate of lead, and making a deduction from the quantity of sulphate of baryta obtained, corresponding to the amount of sulphate in the solution. The cyanate was estimated approximatively from the amount of ammonia, generated by boiling a solution of the "metal," after converting the whole of the cyanide into ferrocyanide.

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* *Polytech. Journ.*, lxxvi., 352.

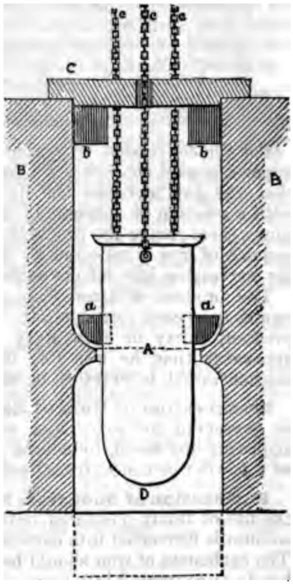
† Ibid., cxl., 317.

‡ *Pharmaceutical Journal*, xiii., 226.

ding to these results, the entire deficit of ferrocyanide arising from the n of these substances, amounts to nearly six per cent.; but as the melt was from a factory that was not conducted so well as might be, this must be . as an extreme case. Hr. Brunnquell was not able to detect any other cyaompounds than those mentioned.

uld appear, therefore, from the above considerations, that the waste of and of potash is a natural consequence of the crude and defective character ethod now adopted, which is not susceptible of any considerable improverond the reduction of this waste within the smallest limits, by facilitating uction of cyanogen from ammonia, employing purer animal substances, and ng the access of ashes from the furnace. With regard to the nitrogenous erial, it should be remembered that its value for the production of ferrois not proportionate to the percentage of nitrogen, but is so much influenced mount of potash requisite for giving the "metal" a proper consistence, that es with very different amounts of nitrogen may, in practice, have the same The addition of iron, about which so much has been written, is undoubtedly geous in retarding the destruction of the melting vessels, and in obviating ffecting the decomposition of sulphocyanide, for which purpose it should be the commencement of the operation. The "metal" should be digested with 140° F. for twenty-four hours, with frequent stirring, the liquid heated to ig point by means of steam passed into it, then allowed to settle, and run off residue, which is afterwards washed with water. The absence of sulphate h from the crystallized ferrocyanide is best ensured by conducting the operation so as to effect its complete reduction, and, upon the whole, the more dependent upon the management of this operation than on any other ance.

regard to the utilization of that portion of nitrogen that is evolved as , during the carbonization of the raw material, Hr. Brunnquell describes an nt that appears to have been more successful than most other attempts of . A cast-iron cylinder, *A*, closed at the ras so arranged in a furnace, *B B*, that it heated principally at the upper open end, d or lowered by means of the chains, *c c c*. bottom of this cylinder was placed a of equal parts dried blood and potash; at r part, a mixture of potash with 40 per ther charcoal. The upper part of the was then heated until the potash was and the heat kept up so as to extend r downwards throughout the entire mass, ras all melted. By this means the gaseous evolved from the blood, was made to the mixture of melted potash and charcoal, formation of cyanogen from the ammonia . It was found that by operating in this e upper portion of the contents of the yielded 4.6 per cent. ferrocyanide of potasd that at the bottom of the cylinder there ass, equal to about one-fifth the contents of nder, consisting of cyanide of potassium onate of potash, which yielded as much as cent. ferrocyanide. Wood charcoal alone e used in the upper part of the cylinder. lication of this method upon the large uld not be attended with any difficulties, s the advantage over all other methods e been proposed for utilizing this source of ,* in which complicated arrangements of employed, and the production of ammonia and its conversion into cyanogen ed by separate operations.



nnquell considers that the production of cyanogen with atmospheric nitrogen† would become applicable to the fabrication of cyanogen compounds used in the arts, only by the invention of a method by which the conversion could be effected in much larger proportion than has yet been possible.

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* *Pharmaceutical Journal*, xv., 278.

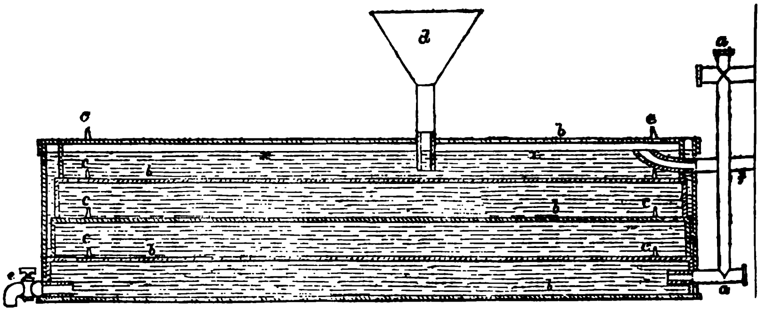
† Ibid., xv., 221.

Hr. Brunnquell has devised a method for the production of ferrocyanide upon the large scale, the principal features of which are the conversion of ammonia into cyanide of ammonium, by ignition with carbon, and the conversion of the cyanide of ammonium into cyanide of potassium, or ferrocyanide, in the wet way.

Theoretically, this method has several advantages over that now adopted.

1. The waste of potash and the cost of recovering it from the mother-liquors, are obviated.
2. Soda may be substituted for potash.
3. Bones may be employed.
4. That portion of ammonia which escapes conversion into cyanogen may be collected and used.

In the production of ferrocyanide by this method, the carbonization of the animal substance should be so managed as to effect the separation of the largest amount of nitrogen in the form of ammonia; it would be best conducted in retorts, similar to those used in the production of coal gas. The conversion of the ammonia into cyanide of ammonium should be effected in earthen tubes filled with fragments of wood charcoal. Iron tubes would not be applicable for this purpose, because the metal decomposes cyanogen at a red heat.



For the conversion of cyanide of ammonium into ferrocyanide of potassium, the apparatus used consisted of a tank, *a*, of sheet iron with diaphragms, *b b*, so arranged that the gas traverses the liquid between each successively. This tank is filled with a solution of sulphate of iron, which, by reaction with the cyanide of ammonium, gives rise to the production of cyanide of iron and sulphate of ammonia. The cyanide of iron is collected by filtration, washed, and boiled with solution of potash, for conversion into ferrocyanide.

The product obtained from blood by this method, was, on the average, ten or twelve per cent. ferrocyanide. Hr. Brunnquell considers that a very much larger product, thirty or even sixty per cent., might be obtained with better adapted apparatus than he was able to employ, but that, apart from this probability, his method would, in practice, be much more advantageous than that generally adopted.

Preservation of Yolk of Egg.—M. Mosselmann[*] has found that yolk of egg may be preserved for some time without losing its clearness or colour, and without acquiring any smell, by adding to it five per cent. of neutral sulphite of soda, either as a powder or concentrated solution.

Purification of Soda from Sulphur.—Hr. Habich[†] recommends for this purpose the use of finely powdered native carbonate of iron, by means of which sulphide of sodium is converted into carbonate, and the sulphur removed as sulphide of iron. The carbonate of iron should be added to the soda-lye before the sulphide of sodium has been converted into hyposulphite of soda.

Mr. Stott has obtained a patent[‡] for the separation of sulphur from "vat liquor" by means of oxides of iron, manganese, or zinc, or the corresponding carbonates.

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[*] *Moniteur Industriel*, 1856, No. 2060.

[†] *Polytechnisches Journal*, cxl., 370.

[‡] Specification, No. 2675, 1855.

Mr. Tilghman has obtained a patent[*] for the production of potash or soda in the wet way, from their sulphates, by means of baryta or strontia. The baryta or strontia is obtained by heating the corresponding sulphates under the alternate influence of deoxidizing and oxidizing agents. In the first instance, sulphurous acid, sulphuretted hydrogen, and sulphide of barium are produced. Then by heating the sulphide of barium in an oxidizing atmosphere, sulphur is separated as sulphurous acid, and by repeating these operations the whole of the sulphate may be decomposed. The sulphates of lime or magnesia may be decomposed by the same means.

Messrs. Stevenson and Williamson have obtained a patent[†] for an improvement in the production of "black ash" soda, which consists in heating the limestone with coal, so as to convert a considerable portion of it into lime before adding the sulphate of soda, and by this means it is stated that the waste of soda is reduced, the amount of cyanide of sodium formed is less, and the "ball soda" produced is more readily dissolved by water.

Production of Photographs by Artificial Light.—Prof. Böttger[‡] states that he has succeeded in obtaining good daguerreotypes and photographs by the light of phosphorus or sulphur burnt in oxygen.

Casein Cement.—Dr. Wagner[§] recommends using a cold saturated solution of borax or alkaline silicate for dissolving casein, instead of alkaline carbonate, as recommended by Bracconot.[‖] The solution of casein with borax is a clear viscous liquid, exceeding gum in adhesiveness, and applicable to many purposes as a substitute for glue; woollen and cotton fabrics saturated with the solution may be tanned with tannic acid or acetate of alumina, and rendered waterproof.

Cobalt Green.—Dr. Wagner[¶] prepares this pigment by mixing freshly precipitated carbonate of cobalt with zinc white, drying and igniting the mass until the reddish violet colour passes into green. The constitution of this pigment may be regarded as analogous to that of aluminate of cobalt. The intensity of the colour depends upon the amount of cobalt. But when the amount of cobalt is more than equivalent to the zinc, a dirty green, or even black substance, is produced. An admixture of phosphoric, arsenic, or arsenous acids renders the colour much brighter; as is also the case with aluminate of cobalt. The best result may be obtained by mixing the mass with a small proportion of arsenous acid previous to ignition. It is indispensable that the cobalt salt should be perfectly free from other metals.

Preparation of Ammonia.—The liberation of ammonia from chloride of ammonium or sulphate of ammonia, by means of lime, requires a somewhat high temperature, which in many instances is inconvenient. To obviate this, Hr. Harms[**] recommends the use of the ordinary carbonate of ammonia, instead of these salts, in its preparation. For this purpose it is mixed with two or three times its weight of hydrate of lime, the mixture introduced into a glass flask, covered with a layer of hydrate of lime, and gently heated by means of a gas flame. It is stated that the gas is evolved readily, and is, even to the last portion, so free from carbonic acid, that it does not produce any precipitate in lime water or chloride of barium solution. Caustic lime cannot be used in place of hydrate of lime.

The carbonate of ammonia would yield, according to calculation, 28.81 per cent. ammonia, and chloride of ammonium would yield 30.85 per cent.

Means of Preserving Solution of Gallic Acid.—M. Glesle Lloyd[††] states that a solution of gallic acid may be kept for a long time without undergoing alteration, when mixed with a drop of oil of cloves.

Presence of Cyanogen in Carbonate of Soda.—Hr. Haenle[‡‡] states that some powders, consisting of three grains carbonate of soda, with as much tartaric acid, and ten grains sugar, were returned, with a complaint that some mistake seemed to have been made, as they had a blue colour. This was found to be owing to the presence of cyanogen in the carbonate of soda, and its reaction with a small quantity of iron in the tartaric acid.

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[*] Specification, No. 1762, 1855.

[†] Specification, No. 2957, 1855.

[‡] *Jahresbericht der Physik. Vereins zu Frankfort, a. m.*

[§] *Polytech. Journ.* cxl., 301.

[‖] *Ann. de Chimie et de Phys.*, xliii., 337.

[¶] *Kunst- u. Gewerbeblatt für Bayern*, 1856, p. 83.

[**] *Archiv. der Pharmacie*, lxxxvi., 282.

[††] *Journ. de Pharm. d'Anvers*, Sept., 1855.

[‡‡] *Neues Repertorium für Pharmacie*, iv., 509.

ON THE CHEMICAL TYPE: AMMONIA.

BY DR. A. W. HOFMANN, F.R.S.

(Substance of a Lecture delivered at the Royal Institution.)

THE great laws which govern chemical combination have been mostly recognized and elaborated by the study of *mineral compounds*, the examination of which at a very early period attracted the attention of inquirers. It was only much later,—in fact, at a comparatively recent epoch, that the *vegetable* and the *animal world* were drawn into the circle of chemical observation. The progress made in the study of *vegetable* and *animal* substances was based, in the commencement at least, entirely and exclusively upon the knowledge which chemists possessed of *mineral* bodies. The experience, the ideas, gained in the examination of *mineral* substances, reflected themselves, if I may use this expression, in whatever views were brought forward regarding the nature of *vegetable* and *animal* compounds. *Organic Chemistry* was but a reproduction, in another form, of *Mineral* or *Inorganic Chemistry.*

This aspect, however, of the relative position of the two departments of the science is rapidly changing. The amount of material accumulated by the indomitable perseverance of so many cultivators of Organic Chemistry (a chaotic and almost inaccessible labyrinth but a few years ago) is rapidly assuming shape and order. The study of *organic* bodies has led to the observation of general laws, which could have never been discovered by the examination of *mineral* substances alone; but which begin to react in a most powerful manner upon our ideas regarding the constitution of these very *mineral* substances. The progress of our knowledge of *organic* bodies has opened new points of view, from which the constitution of *mineral* substances appears to us in a brighter light, in a simpler and more intelligible form. In one word, Organic Chemistry is beginning to repay, and I venture to say, with interest, the debt of gratitude which it owes to her elder sister, Mineral Chemistry.

It is my task this evening to bring under your notice some especial examples in elucidation of the idea which I have endeavoured to delineate to you. Illustrations of this kind might be taken from widely different departments of the science. In consequence of special studies and predilections of my own, I have selected as materials of illustration a class of substances of which the well-known compound Ammonia is the type.

The four elements—Nitrogen, Phosphorus, Antimony, and Arsenic, although essentially differing in many of their physical properties, exhibit nevertheless an extraordinary similarity in their chemical characters, and especially in their combining tendencies. With oxygen these four bodies produce teroxides and pentoxides, which, in combination with water, have all decidedly acid properties.

Nitrous Acid	NO_3	Nitric Acid	NO_5
Phosphorus Acid	PO_3	Phosphoric Acid	PO_5
Antimonious Acid	SbO_3	Antimonic Acid	SbO_5
Arsenious Acid	AsO_3	Arsenic Acid	AsO_5

The latter acids, moreover, appear to be all tribasic; in phosphoric and arsenic acids the tribasic character is well marked; with antimonic acid it is less pronounced; and nitric acid is generally considered as a monobasic acid, but the progress of science will, I have no doubt, confirm our suspicion that the nitrogen acid is likewise of a tribasic character. The chlorides and bromides, corresponding to the oxides of nitrogen, phosphorus, antimony, and arsenic, also exhibit, within certain limits, singular analogies.

Again, these four elements unite with hydrogen, and the compounds thus produced have a similar composition; they are all terhydrides.

Ammonia	NH_3
Phosphoretted Hydrogen	PH_3
Antimonetted Hydrogen	SbH_3
Arsenetted Hydrogen	AsH_3

So far the analogy appears to be complete. Extraordinary discrepancies, however, are observed in the properties of these hydrogen compounds; for although they are all gases at the common temperature, although they all possess a marked odour, and are more or less inflammable, we find that ammonia is *soluble* in water, imparting a *strongly alkaline character* to this solution; while the three other compounds, phosphoretted, antimonetted, and arsenetted hydrogens are *insoluble* in water, and *without the slightest alkaline reaction.* Again, ammonia, when coming in contact with acids, absorbs these bodies with the greatest avidity, producing a series of well

, mostly crystalline compounds, which are called salts of ammonia, or iacal salts, and of which sal ammoniac and sulphate of ammonia are familiar tions. Antimonetted and arsenetted hydrogen, on the other hand, have een combined with acids ; and in the case of phosphoretted hydrogen, only -like compound, the hydriodate of phosphoretted hydrogen, is known, which rtainly presents considerable analogies with the salts of ammonia.

Sulphate of Ammonia .... NH_3, HSO_4
Hydriodate of Ammonia......................... NH_3 HI
Hydriodate of Phosphoretted Hydrogen ... PH_3 HI

vant of similarity observed in the general characters of ammonia and the n compounds of phosphorus, antimony, and arsenic, has always been an in the way of considering the four elements in question as members of the tural family.

nodern progress of Organic Chemistry has removed those difficulties.

nic Chemistry deals with compound molecules, consisting of carbon and n, occasionally associated with nitrogen and oxygen. These compound es, often called compound radicals, simulate the deportment and exercise ctions of elementary substances. One of the most familiar illustrations of radicals is the radical Ethyl, consisting of four equivalents of carbon, and hydrogen, $C_4H_5 = E$, and which chemists assume to exist in *alcohol* and *ether*, vation of which from water becomes obvious by a glance at the following :—

$$\text{Water} \ldots\ldots\ldots\ldots \left\{\begin{matrix} \text{H O} \\ \text{H O} \end{matrix}\right.$$

$$\text{Alcohol} \ldots\ldots\ldots\ldots \left\{\begin{matrix} \text{E O} \\ \text{H O} \end{matrix}\right.$$

$$\text{Ether} \ldots\ldots\ldots\ldots \left\{\begin{matrix} \text{E O} \\ \text{E O} \end{matrix}\right.$$

ol may be regarded as water, in which *one* equivalent of hydrogen is replaced l; *ether*, as water, for the *two* hydrogen-equivalents of which ethyl has been ted. The general characters of these three compounds greatly differ from ther; but some of the fundamental properties of water, its neutral character ance, are retained in the two substitution products.

nt researches have proved that in ammonia likewise the hydrogen-equivalents aceable by ethyl. Three new compounds are thus producèd, which have d the names *ethylamine*, *diethylamine*, and *triethylamine* : and the composition of is illustrated by the following formulæ :—

$$\text{Ammonia} \ldots\ldots\ldots\ldots \text{ N } \left\{\begin{matrix} \text{H} \\ \text{H} \\ \text{H} \end{matrix}\right.$$

$$\text{Ethylamine} \ldots\ldots\ldots\ldots \text{ N } \left\{\begin{matrix} \text{E} \\ \text{H} \\ \text{H} \end{matrix}\right.$$

$$\text{Diethylamine} \ldots\ldots\ldots\ldots \text{ N } \left\{\begin{matrix} \text{E} \\ \text{E} \\ \text{H} \end{matrix}\right.$$

$$\text{Triethylamine} \ldots\ldots\ldots\ldots \text{ N } \left\{\begin{matrix} \text{E} \\ \text{E} \\ \text{E} \end{matrix}\right.$$

three ethylated derivatives fully retain the fundamental character of ammonia; re powerful bases, capable of uniting with the acids, and of forming very , well-crystallizing salts. Owing to the diminution of volatility with the s of ethylation, the ethylated bases appear to be even more powerfully basic e type itself. This development of basic power, as will be presently seen, s especial consideration. The substitution of ethyl for hydrogen presents no ty. It may be effected by several methods, one of the commonest processes ing in the action of iodide of ethyl upon the body to be ethylated. Thus, ia and iodide of ethyl produce ethylamine and hydriodic acid, which unite re rise to the formation of hydriodate of ethylamine.

$$\text{N} \left\{\begin{matrix} \text{H} \\ \text{H} \\ \text{H} \end{matrix}\right. + \text{EI} = \text{N} \left.\begin{matrix} \text{E} \\ \text{H} \\ \text{H} \end{matrix}\right\} \text{HI}$$

nsequence of the ethylated derivatives of ammonia retaining the basic character of the type, and exhibiting it, under certain conditions, even in a higher degree, the question naturally suggested itself, What would be the effect of introducing ethyl into phosphoretted, antimonetted, and arsenetted hydrogen ?

The ethylation of these hydrogen-compounds presents difficulties not experienced with the nitrogen-series, and has been accomplished only by roundabout processes. Nor have all the terms, the existence of which theory suggests, as yet been obtained: compounds corresponding to ethylamine and to diethylamine are wanting at present, but the substances which correspond to triethylamine are known.

The following table exhibits the compounds belonging to this group which are known :—

Nitrogen-Series.	*Phosphorus-Series.*	*Antimony-Series.*	*Arsenic-Series.*
Ammonia .... $N\left\{\begin{matrix}H\\H\\H\end{matrix}\right.$	Phosphoretted Hydrogen $P\left\{\begin{matrix}H\\H\\H\end{matrix}\right.$	Antimonetted Hydrogen $Sb\left\{\begin{matrix}H\\H\\H\end{matrix}\right.$	Arsenietted Hydrogen $As\left\{\begin{matrix}H\\H\\H\end{matrix}\right.$
Ethylamine...... $N\left\{\begin{matrix}E\\H\\H\end{matrix}\right.$	Unknown.	Unknown.	Unknown.
Diethylamine... $N\left\{\begin{matrix}E\\E\\H\end{matrix}\right.$	Unknown.	Unknown.	Unknown.
Triethylamine.. $N\left\{\begin{matrix}E\\E\\E\end{matrix}\right.$	Triethylphosphine......... $P\left\{\begin{matrix}E\\E\\E\end{matrix}\right.$	Triethylstibine $Sb\left\{\begin{matrix}E\\E\\E\end{matrix}\right.$	Triethylarsine $As\left\{\begin{matrix}E\\E\\E\end{matrix}\right.$

Now triethylphosphine, triethylstibine, and triethylarsine are substances exhibiting, although in a less prominent degree, all the fundamental characters of triethylamine, and consequently of ammonia itself. They are well defined and powerful bases, capable of uniting with the acids and of producing a series of remarkable, mostly crystalline salts, in which we find all the properties of the ammoniacal salts. Chemists have thus succeeded in rendering visible to the mental eye, if I may say so the true nature of phosphoretted, antimonetted, and arsenetted hydrogen. By the conversion of these *mineral* substances into *organic* compounds, by the simple process of ethylation, their alkaline disposition, not to use the term character, has been unmistakably brought to light. The formation of alkaline bodies similar to ammonia, by the substitution of ethyl for the hydrogen in phosphoretted, antimonetted, and arsenetted hydrogen, leaves no doubt regarding the analogy of these substances with ammonia, and thus we see *that researches carried out exclusively in the field of* ORGANIC CHEMISTRY *have lent most valuable assistance in deciding a question of considerable importance regarding the classification of* MINERAL SUBSTANCES. These researches have furnished the last argument which was wanting to prove that nitrogen, phosphorus, antimony, and arsenic form a natural group of elements, the chemical history of which presents analogies not less prominent than those which are observed with the elements chlorine, bromine, and iodine.

The type ammonia offers another interesting illustration of the influence which the progress of Organic Chemistry exerts upon the Mineral Department of the science, and of the unexpected support which some of the mineral theories have received from the development of our ideas regarding the constitution of organic substances.

Soon after Sir Humphrey Davy's immortal discoveries of the alkali-metals, chemists were led by the extraordinary analogy of the salts of these metals with those of ammonia, to assume in the latter a metallic substance similar to potassium and sodium. Numerous experiments were made to isolate this metallic principle from the ammoniacal salts, and the resources of electricity, which had exhibited such wonderful powers in the hands of Sir H. Davy, were not appealed to without result. The metal itself, it is true, was not isolated, but a compound or alloy was obtained, containing nitrogen and hydrogen, and the metallic character of which was indisputable. If the electric current be passed into a solution of ammonia floating upon a layer of mercury in such a manner that the positive pole of the battery merely dips into the ammonia, while the negative pole is immersed in the mercury, a very remarkable phenomenon is observed ; the mercury begins to swell up, and is gradually converted into a mass of buttery consistence, but retaining a perfect *metallic* lustre, while pure nitrogen gas arising from the oxidation of ammonia makes its appearance at the positive pole. Removed from the influence of the battery, the altered mercury soon resumes its original appearance, losing at the same time hydrogen and ammonia in the proportion of one equivalent of the former (H) to one of the latter ($N H_3$). It was therefore argued that the mercury owed the alteration of its properties to its being associated with hydrogen and ammonia, that is with $N H_4$, and since mercury in its combinations never retains any metallic appearance, except in its alloys called amalgams, that is in its combination with metallic substances, chemists considered themselves entitled to attribute *metallic* characters also to the hypothetical association of nitrogen and hydrogen, represented by the formula $NH_4 = Am$, for which, forthwith, the name of *Ammonium* was proposed.

By assuming the existence of this hypothetical metal in the salts of ammonia, the nature of these substances, their analogy with the salts of the fixed alkalies, and especially the isomorphism of the salts of ammonia and potassa, became at once intelligible. The following table exhibits the ammoniacal salts (represented firstly, as combinations *of ammonia*, with hydrated acids; and secondly, as *ammonium*-compounds) in juxtaposition with the corresponding terms of the potassium-series.

	Ammonia-Compounds.	*Ammonium-Compounds.*		*Potassium-Compounds.*
Oxide	NH_3, HO	NH_4 O or	Am O	K O
Chloride ...	NH_3, HCl	NH_4 Cl or	Am Cl	K Cl
Sulphate ...	NH_3, HSO_4	NH_4 SO_4 or	Am SO_4	K SO_4
Nitrate......	NH_3, HNO_6	NH_4 NO_6 or	Am NO_6	K NO_6

The analogy of chloride, sulphate, and nitrate of ammonium, with the corresponding potassium-compounds, is complete, but the analogy begins to fail when we compare the *oxides* of ammonium and potassium. Oxide of potassium, potash, is a perfectly definite body, the properties of which, especially in its hydrated condition, are well known. On the other hand, all attempts to isolate the oxide of ammonium or its hydrate have been hitherto abortive. Liberated from one of the ammonium-compounds it splits at once into ammonia-gas and water, even at the common temperature. The impossibility of producing the oxide of ammonium has been always adduced as an argument against the ammonium-theory.

This difficulty disappears entirely if we examine the deportment of some of the compounds briefly described in the preceding part of this lecture. By again submitting triethylamine, that is ammonia containing three equivalents of ethyl in the place of three of hydrogen, to the action of iodide of ethyl, a beautiful crystalline compound is obtained, the composition of which is represented by the formula—

$$N\left\{\begin{matrix}E\\E\\E\\E\end{matrix}\right\}I$$

that is iodide of ammonium, in which the four hydrogen-equivalents are replaced by a corresponding number of equivalents of ethyl, or *iodide of tetrethylammonium*. If this compound be treated with freshly precipitated oxide of silver, a decomposition takes place, which gives rise to the formation of iodide of silver, separating as a precipitate, and of the hydrated ammonium-oxide, corresponding to the above-mentioned iodide or *hydrated oxide of tetrethylammonium*, which remains in solution. The following equation elucidates this change :—

$$N\left\{\begin{matrix}E\\E\\E\\E\end{matrix}\right\}I + Ag\,O + H\,O = Ag\,I + N\left\{\begin{matrix}E\\E\\E\\E\end{matrix}\right\}O, H\,O$$

Iodide of tetrethylammonium.	Hydrated oxide of tetrethylammonium.

The solution of this compound oxide of ammonium may be evaporated to dryness without decomposition; a crystalline substance is thus obtained of a most powerfully alkaline character, resembling in every respect hydrated potassa itself. A concentrated solution of this substance not only burns the tongue, but acts upon the epidermis, which it destroys like potassa or soda. On rubbing the solution between the fingers, the well-known soapy sensation produced by the fixed alkalies under the same circumstances is felt. Moreover, the same peculiar odour is perceived. Oxide of tetrethylammonium saponifies the fats without difficulty; beautiful soft soaps are thus obtained, possessing all the properties of ordinary potassa-soap. All the chemical effects produced by potassa or soda are likewise produced by oxide of tetrethylammonium, and in its deportment with the salts of the metals especially, the compound oxide of ammonium can scarcely be distinguished from the fixed caustic alkalies.

The formation of oxide of tetrethylammonium is certainly one of the most powerful props which the ammonium-theory could have received, and since this support has been entirely and exclusively furnished by researches performed within the domain of *Organic Chemistry*, it must be admitted that the researches made in this department of the science, and especially the elaboration of the compound derivatives of the type ammonia begin to react most powerfully and beneficially upon the progress of *Mineral Chemistry*.

CHEMICAL REPORT ON THE MODE OF DETECTING VEGETABLE SUBSTANCES MIXED WITH COFFEE FOR THE PURPOSE OF ADULTERATION.

BY PROFESSOR GRAHAM, DR. STENHOUSE, AND MR. DUGALD CAMPBELL.

Addressed to the Chairman of the Board of Inland Revenue.

The adulteration of coffee in the condition of the original bean, unground and unroasted, could only be effected by the substitution of a different seed, and would form the subject of an inquiry entirely botanical. But it is proper to remark that the coffee-bean is liable to be rendered entirely worthless, without any injury to its structure, when kept in a wet or damp state for some time,—apparently from the readiness with which the soluble constituents of the bean spontaneously ferment. Coffee damaged by sea-water has been found to retain neither the aroma nor bitter flavour of the seed, and to have lost the whole of its characteristic principle, caffeine. The entire soluble matter which can be extracted from the damaged seeds by boiling water is greatly reduced, and does not exceed twelve per cent. of their weight, while the presence of the salts of sea-water is always sufficiently obvious.

The coffee-bean, in its fresh, unprepared state, is tough, and ground with difficulty. It yields an infusion without aroma, which is bitter, and is said to act more powerfully on the nerves than roasted coffee. This seed, however, is always roasted before being made use of, and it is in that state, and with its structure more or less obliterated by grinding, that it must be identified, and its purity established by chemical means of investigation.

In consequence of torrefaction, coffee is materially altered, and acquires new properties. The woody tissue of the fresh bean is horny, and differs from ordinary woody fibre in its composition, and is also said not to yield sugar when treated with sulphuric acid. By the roasting, this woody tissue undergoes a partial decomposition, and becomes friable, and the difficulty of pulverizing the seed, and exhausting it by water, is removed. There is produced at the same time a soluble brown bitter matter, due in part to a gummy substance pre-existing in the coffee, altered like starch by torrefaction, but principally to the conversion into caramel of a quantity of sugar in the coffee-bean, amounting to six or seven per cent. of its weight.

A still more characteristic product of the roasting of coffee, is that which gives it aroma. This principle, when separated from the infusion of coffee by distillation, is found to be a brown liquid oil, heavier than water, soluble in ether, and has received the name of *Caffeone* (Boutron and Frémy). Caffeone is slightly soluble in boiling water; a quantity of caffeone which is almost insensible will aromatise two or three pints of water.

In common with all the valuable constituents of coffee, caffeone is found to come from the soluble portion of the roasted seed.

The caffeic acid of the green coffee is also changed by the roasting into an acid of different properties.

Of the crystallizable caffeine, a small portion may be lost from its volatility in roasting.

No seed appears to be known, which, roasted and pulverized, forms a true equivalent and sufficient substitute for coffee, either in the physiological properties or chemical composition of its soluble extract. A great variety of seeds were tried in France, as substitutes for coffee, during the continuance of the Continental blockade, including, in addition to maize, barley, oats, and the other cereals, the seeds of the yellow flag (*Iris pseudo-acorus*), grey pea (*Cicer arietinum*), the milk vetch, or Andalusian astragalus (*Astragalus boeticus*), the *Hibiscus esculentus*, holly, Spanish broom, acorns, chesnuts, the small lupin (*Lupinus angustifolia*), peas, haricots horse-beans, sunflower, pips of the gooseberry and grape, eglantine (*Rosa villosa*), and the capsules of box (*Buxus sempervirens*). Of the seeds enumerated, the yellow flag, a common marsh plant in England, appears to have offered the only similarity to coffee ; but it is doubtful whether the resemblance extended beyond the aroma of this seed when roasted, which is certainly suggestive of coffee.

The search made among the seeds of other plants for a substitute for the coffee-berry may then be said to have entirely failed.

The divergence of the root-substitutes from true coffee is still greater in every property except one. The roots which have been most used are those of chicory (*Cichorium intybus*), carrot, beet, rush-nut (*Cyperus esculentus*), earth-nut (*Arachis hypogæa*), scratch-weed (*Gallium aparine*), fern (*Polypodium filix mas*), and butchers' broom (*Ruscus aculeatus*).

The roots of chicory, and of beet and carrot, which are all extensively used in Germany, are similarly prepared, being cut into thin slices, dried in a stove, and then passed through a coffee-roaster—generally with the addition of about two per cent. of butter, and sometimes of a red powder, to give the colour of coffee.

It is to be remarked of the roots, that they are generally used rather as an addition to coffee than as a substitute for it. In one property these roots all agree, and we have no doubt that it has led to this common application of them: chicory, beet, carrot, &c., are all remarkable for containing a large quantity of sugar, easily caramelized by heat. They acquire, when roasted, the bitter of burnt sugar, with a somewhat similar aroma. Now the taste of this bitter appears to be one of the strongest and most general of our gustatory preferences. It equally recommends toast-water, and the varieties of brown beer or porter, in the preparation of which a portion of malt is used with its sugar caramelized by heat. The caramel bitter is, in fact, a stock flavour, which we find modified by the most various accessories in different beverages, and even in solid articles of diet in a cooked state. It is not surprising, therefore, that the chicory root, containing as it does about thirty per cent. of sugar, more than one-half of which is caramelized in roasting, should obtain extensive favour as an addition to coffee. Fresh chicory has a certain bitterness, or rather acridity, but this is overpowered in the torrefied root by the caramel bitter, and this root may be adequately replaced by the bland beet or carrot similarly prepared. No one of these roots contains any constituent which associates it with coffee, except sugar; in other respects they are entirely different.

The preparation of roasted chicory appears to have originated in Holland upwards of a century ago, but remained secret till 1801. It is now prepared on a great scale, both on the Continent and in England. The quantity of chicory-powder consumed annually in France is known to amount to 6,000,000 kilogrammes.

In the chemical examination of ground coffee, with the view to discover if it is mixed with the vegetable substances which have been named, or with others, the characteristic constituents of the coffee are less immediately available than certain properties of the infusion of a physical character. This arises from the circumstance, that although it is easy to discover the presence of caffeic acid and caffeine, yet the determination of the exact quantity of these substances in an infusion is both difficult and tedious.

There is reason also to believe that the proportion of caffeic acid and caffeine varies considerably in different samples of coffee, so that the quantities of these substances (when found) could not show exactly the proportion of pure coffee in a mixture. It will be most advantageous to discuss here the general properties of the coffee infusion, in the first instance, as they are most easily observed; and a single character of this kind in some instances, and two or three in others, will generally be sufficient to establish adulteration when it has been practised. The higher chemical inquiries will then follow.

1. When hot water is applied to the powder of chicory and other roots, it softens immediately, from the facility with which water is imbibed, while the grains of coffee remain hard and gritty in the same circumstances. Ground chicory is highly hygroscopic.

Roasted grain, such as wheat and barley, gives an infusion with hot water, which is mucilaginous and thick, while the infusion of coffee is remarkably thin and limpid. The grain infusion generally contains starch, and gives, when cool, a blue colouration with iodine, while the infusions of both coffee and chicory appear to be entirely destitute of starch.

2. The more deep and rapid colouration of water by chicory and the allied roots than by coffee, affords a useful indication in a preliminary examination. The roasted grains also appear to colour water more deeply than coffee does. The relative colouring power of coffee, chicory, and a variety of other vegetable substances used in the adulteration of coffee, was determined with considerable precision by infusing equal quantities of each in water, as in the preparation of coffee, filtering the infusions through paper, and observing the colour in glass tubes of equal diameter—about one inch. The solutions required to be very dilute. It was also necessary to have a standard of comparison, and for this purpose caramel, carefully prepared from cane-sugar, was had recourse to. The standard solution of caramel consisted of one grain of that substance dissolved in 2000 grains of water. To produce the same intensity of colour as the standard solution, a larger proportion than one grain of all the other substances required to be dissolved in 2000 grains of water. The proportion necessary is expressed in Table I. The substances are all roasted, as they would be used to mix with coffee.

TABLE I.

Weight of substance (roasted) dissolved in 2000 *parts of water, to produce an equal depth of colour.*

Caramel	1.	Red beet	3.33
Mangold-wurzel	1.66	Bread raspings	3.64
Bohka (a coffee substitute)	1.66	Acorns	5.00
Sparke's vinegar colouring	1.74	Over-roasted coffee	5.46
Black malt	1.82	Highly-roasted coffee	5.77
White turnips	2.0	Medium-roasted coffee	6.95
Carrots	2.0	Another specimen of coffee	6.66
Chicory (darkest Yorkshire)	2.22	White lupin seed	10.00
Parsnips	2.5	Peas	13.33
Maize	2.86	Beans	13.33
Rye	2.86	Spent tan	33.
Dandelion root	3.33	Brown malt	40.

It will be seen from the preceding table, that 2.22 parts of chicory have the same colouring power as 5.77 grains of highly-roasted, and 6.95 grains of medium-roasted coffee, or of 13.33 grains of roasted peas, and forty parts of brown malt.

The same results are given in a different form in Table II.

TABLE II.

Colouring power of various substances (roasted) dissolved in an equal quantity of water.

Caramel	1000.	Red beet	300.3
Mangold-wurzel	602.4	Bread raspings	274.72
Bouka (a coffee substitute)	602.4	Acorns	200.
Sparke's vinegar colouring	574.71	Over-roasted coffee	183.15
Black malt	549.45	Highly-roasted coffee	173.31
White turnips	500.	Medium-roasted coffee	143.88
Carrots	500.	Another specimen of coffee	150.15
Chicory (darkest Yorkshire)	450.45	White lupin seed	100.
Parsnips	400.	Peas	73.18
Maize	350.	Beans	75.18
Rye	350.	Spent tan	30.
Dandelion root	300.3	Brown malt	25.

The number for chicory (450) indicates that that substance possesses nearly half the colouring power of caramel (1000); while highly-roasted coffee (173) is about one-sixth of caramel. Maize and rye, with probably all the other cereals, rise to 350, and have therefore a high colouring power, quite double that of coffee; while peas and beans (75) are on the other side, and possess only about half the colouring power of coffee for equal weights of the substances compared.

The preceding solutions were prepared at 212°, and chicory then exhibits about three times the colouring power of coffee. But when the solutions are prepared without heat, the disparity is still greater. In cold water chicory exceeded coffee about four and a half times in colouring power.

When a few grains of roasted chicory, or any other sweet root, are dropped into a glass of cold water, without being stirred, a yellowish-brown colour diffuses rapidly through the liquid, while the pure coffee gives no sensible colour to the water in similar circumstances.

3. Another property of infusions, which is still more precise and valuable, is their specific gravity.

The proportion of substance found most suitable for an extensive comparison was one in ten of water. The substances were not exhausted by water, but simply placed in about a pint of cold water, in the preceding proportion by weight, and the temperature raised to 212°, and retained at that point for not more than half a minute. The infusions were then filtered through paper. The substances, as usual, are roasted and ground equally fine, with the exception of the last three in the table.

TABLE III.

Specific gravity of solutions at 60° F., one part of substance to ten parts of water.

Spent tan	1002.14	English chicory (Yorkshire)	1019.1
Lupin seed	1005.7	Black malt	1021,2
Acorns	1007.3	Turnips	1021.4
Peas	1007.3	Rye meal	1021.6
Mocha coffee	1008.0	English chicory	1021.7
Beans	1008.4	Dandelion root	1021.9
Neilgherry coffee	1008.4	Red beet	1022.1
Plantation Ceylon coffee	1008.7	Foreign chicory	1022.6
Java coffee	1008.7	Guernsey chicory	1023.2
Jamaica coffee	1008.7	Mangold-wurzel	1023.5
Costa Rica coffee	1008.98	Maize	1025.3
Native Ceylon coffee	1009.0	Bread raspings	1026.3
Costa Rica coffee	1009.5	British gum	1037.9
Brown malt	1010.9	Gum arabic	1038.6
Parsnips	1014.3	Cane sugar	1040.9
Carrots	1017.1	Starch sugar	1042.8
Bouka	1018.5		

The leguminous seeds, it appears, give a low specific gravity—peas 1007.3, and beans 1008.4. The coffees are also remarkably low, varying from Mocha coffee 1008.0, to Costa Rica 1009.5; while chicory rises greatly, ranging in different samples between 1019.1 and 1023.2. The cereals are equally high, or still higher, in the scale of gravity; rye-meal being 1021.6, and maize 1025.3. The low gravity of the coffee infusion, therefore, distinguishes it sharply from the two most important classes of adulterating substances,—the roots and cereals.

4. The action of other solvents, besides water, may be shortly referred to.

Agitated four times successively in ten times their weight of ether, the substances to be mentioned gave different proportions of matter soluble in that menstruum:—

Roasted beans	1.81	per cent.	of oil and	resin
" maize	5.15	"	"	"
" chicory (Yorkshire)	6.83	"	"	"
" coffee (Mocha)	15.93	"	"	"

including probably nearly one per cent. of caffeine.

It thus appears that coffee yields much more soluble matter to ether than beans, maize, or chicory, which represent the three classes of leguminous seeds, cereals, and sweet roots. The fat obtained from chicory was no doubt principally composed of the sweet American or Australian tallow, added by English manufacturers to the root, in roasting, to prevent burning. The experiment with ether is easily made, and may in particular circumstances prove valuable.

The solubility of the same substances in proof spirit was observed, the substance being exhausted four times in succession by ten times its weight of proof spirit, at the boiling temperature.

Roasted beans gave 17.5 per cent. of a dry, blackish, lustrous extract.

Roasted maize gave 50.2 per cent. of an extract much like the preceding.

Roasted chicory (Yorkshire) gave 67.76 per cent. of extract of a lighter colour than the preceding, but otherwise very similar.

Roasted coffee (Mocha) gave 26.35 per cent. of extract, much like the first two in external appearance.

These operations are remarkably tedious, while the experiments with ether, on the contrary, are easy and simple. The results with proof spirit are not sufficiently characteristic to recommend its application.

5. Fermentation by means of yeast gives a decisive proof of the adulteration of coffee by many vegetable substances, particularly by chicory and the other saccharine roots.

In our fermentation experiments, 2000 grains of the coffee or other substances were weighed out, and treated successively with one pint and a half of cold water, one pint and a half of water about 174°, and a little additional water for washing the solid residue upon a filter of fine calico. About three pints of infusion were thus obtained, which were mixed with 250 grains of brewers' yeast, weighed after being pressed in a calico bag. The fermentation was continued for forty-eight hours, at a temperature of from 80° to 90°. The fermented liquor was afterwards distilled, and about 6000 grains brought over. The last vinous liquor was rectified a second time, about 3000 grains being now collected; and the alcohol was inferred from the density of this distillate.

The substances were examined for sugar both before and after being roasted, as it was interesting to observe the extent to which the sugar is caramelized, by torrefaction, in the different substances.

The sugar of coffee is found to be reduced by roasting from six to seven per cent. in raw coffee, to from 0, to 1.12 per cent. in the roasted,—or to be almost entirely destroyed; while in other substances the sugar is more generally reduced, by precisely similar treatment, to from one-half to one-third of its original proportion. It is difficult to account for this dissimilarity, unless a portion of the sugar of raw coffee exists in a state of conjugate combination, like the sugar in tannin, amygdalin, salicin, &c. Our attempts to isolate such a conjugate body, however, from raw coffee, have not yet proved successful, and its existence is therefore hypothetical. We succeeded, on the other hand, in crystallizing out cane-sugar from an infusion of raw coffee. It was decided by proper experiments that the fermentation of sugar was not interfered with by the empyreumatic products, or essential oil of roasted coffee.

The sugar was determined which exists in the most dissimilar varieties of coffee, the wild and cultivated beans, the beans from Ceylon and the West Indies, from Arabia, and the Neilgherry Hills. Twelve different samples were examined, each both before and after roasting.

TABLE IV.

Sugar found in coffee, before and after torrefication.

	Sugar per cent.			Sugar per cent.	
	Raw.	Roasted.		Raw.	Roasted.
1. Plantation Ceylon ...	7.52	1.14	7. Costa Rica	6.72	0.49
2. " " ...	7.48	0.63	8. " "	6.87	0.40
3. " " ...	7.70	0.0	9. Jamaica	7.78	0.0
4. " " ...	7.10	0.0	10. Mocha	7.40	0.50
5. Native Ceylon	5.70	0.46	11. "	6.40	0.0
6. Java	6.73	0.48	12. Neilgherry	6.20	0.0

The sugar in coffee appears to be increased by cultivation,—the proportion in Native Ceylon being 5.7 per cent., and in Plantation Ceylon from 7.1 to 7.7 per cent.

The proportion of sugar in the dried roots is high at first, and continues after roasting still very notable.

TABLE V.

Sugar in chicory and other sweet roots, before and after torrefication.

	Sugar per cent.			Sugar per cent.	
	Raw.	Roasted.		Raw.	Roasted.
Foreign chicory	23.76	11.98	Turnips	30.48	9.65
Guernsey chicory	30.49	15.96	Beet root (red)	24.06	17.24
English chicory	35.23	17.98	Dandelion root	21.96	9.08
" " (Yorksh.)	32.06	9.86	Parsnips	21.70	6.98
Mangold-wurzel	23.68	9.96	Bouka (a coffee substitute)	—	5.82
Carrots (ordinary)	31.98	11.53			

It thus appears that roasted chicory, as it is sold for mixing with coffee, retains from 9.86 to 17.98 per cent. of undecomposed sugar. In none of the other sweet roots which are occasionally substituted for chicory, such as mangold-wurzel, beet, turnip, or carrot, does the proportion of sugar retained after torrefaction fall under nine per cent., with the exception of parsnip, in which the sugar falls to 6.98 per cent. The coffee substitute, "Bouka," falls into this class, and appears to be a mixture of true coffee with a torrefied sweet root.

The last group is composed of the leguminous and certain other seeds, with the cereals. The sugar was determined for most of these substances in the roasted form of the grain only, which alone affects the question of adulteration.

TABLE VI.

Sugar in various seeds, before and after torrefication.

	Sugar per cent.			Sugar per cent.	
	Raw.	Roasted.		Raw.	Roasted.
Acorns	3.64	2.70	Bread-raspings	—	1.78
Horse-beans	—	1.62	Lupin-seed	—	0.74
Peas (grey)	—	1.08	Brown malt	8.48	—
Maize	—	0.82	Black malt	—	1.66
Rye-meal	—	1.96			

In the roasted seeds enumerated, the proportion of sugar is sensible, but not sufficiently considerable to give the means of distinguishing leguminous seeds and cereals from coffee. In roasted acorns, the sugar rises to 2.7 per cent., and black malt, it will be observed, still retains 1.66 per cent. of fermentable matter.

The fermentation test, on the other hand, is adapted to detect adulteration by chicory and the sweet roots, and will, we believe, from its certainty and facility of application, prove eminently useful for that purpose.

(*To be continued.*)

ON ERYTHROPHLEUM JUDICIALE (THE SASSY BARK TREE OF CAPE PALMAS.)

BY WILLIAM PROCTER, JUN.

The first paper on this subject, published at page 301, vol. xxiii. of this Journal,* was necessarily imperfect in its botanical relations, owing to the flowers of the plant not being among the specimens on which the account was based, the tree being in fruit at the time they were collected. Since then I have received from Dr. McGill, through Moses Sheppard, Esq., of Baltimore, several very perfect specimens of the inflorescence of the Sassy bark tree, preserved in diluted alcohol, by which its characters have been studied, and are presented in the following essay:—

After a careful examination of accessible works on the botany of Western Africa, no further accounts of the Sassy tree or allied trees have been found than those mentioned in the first essay. Neither Endlicher, Lindley, nor Don, who give the generic characters of Erythrophleum (Afz.), mention any species, or give the specific characters of any of them.

The *red water tree* of Sierra Leone, first noticed by Winterbottom in his account of that colony (vol. i., p. 129), was afterwards noticed by Professor Afzelius, who resided several years in that region, and was erected into a new genus Erythrophleum* distinct from Inga, to which genus it and several allied species had been referred. Robert Brown, in his botanical appendix to Tuckey's Narrative of an Expedition to Congo, p. 467, states that "the ordeal tree noticed in Professor Smith's journal under the name of cassa, and in Captain Tuckey's narrative erroneously called a species of cassia, if not absolutely the same plant as the *red water tree* of Sierra Leone, and as it is said of the Gold Coast, belongs at least to the same genus." Mr. Brown further states, in speaking of the leguminous plants of the Congo expedition, "Of the second order Cæsalpineæ, the collection contains nineteen species, among which are four unpublished genera. One of these is Erythrophleum of Afzelius, the *red water tree* of Sierra Leone, another species of which genus is the ordeal plant or *cassa* of the natives of Congo."

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* *The American Journal of Pharmacy.*

In subsequently describing the plants collected by Denham and Clapperton (see Brown's appendix to D. and C.'s travels, p. 234), Mr. Brown observes that several leguminous plants have been discovered in Western Africa with the club-shaped spike, which have characters fully sufficient to distinguish them from Inga, to which they had hitherto been referred. These plants have been classed together, the type of the tribe being the genus Parkia, one of the most striking and beautiful of equinoctial Africa, so named by Mr. Brown "as a tribute to the memory of the celebrated traveller." Mr. Brown further says, "I have formerly endeavoured to distinguish mimoseæ from cæsalpineæ, by the valvular æstivation of its floral envelopes, and by the hypoginous insertion of its stamens. Instances of perigynous insertion of stamens have since been noticed by MM. Kunth and Auguste St. Hilaire."

"Erythrophleum, another genus indigenous to equinoctial Africa, which I have elsewhere had occasion to notice (vid. ante), and there referred to cæsalpineæ, more properly belongs to mimoseæ, *although its stamens are perigynous.* In this genus, both calyx and corolla are perfectly regular, and their æstivation, if not strictly valvular, is at least manifestly imbricate, though the flower buds are neither acute nor angular. In Erythrophleum and Parkia, therefore, exceptions to all the assumed characters of mimoseæ are found, and there is some approach in both genera to cæsalpineæ."

A careful study of the specimens from Cape Palmas, in view of the facts contained in the above quotations, has led to the opinion that the Sassy bark tree is not only an Erythrophleum, as supposed in my former essay, but closely resembles the *red water tree* of Sierra Leone, as supposed by R. Brown in reference to the ordeal plant of Congo. The reasons for this belief, in the absence of the specific characters of the Sierra Leone tree, are, the proximity of Cape Palmas to the latter colony, the similar application of its bark as an ordeal, and its strong colouring power when infused in water, which property has given name to the Sierra Leone plant. On the other hand, the alternate position of the folioles of the Sassy tree, whilst those of the red water tree are opposite, render their identity at least doubtful.

As no specific name has been given to the red water tree—and as the Sassy bark tree may be identical, I have called it Erythrophleum *judiciale*, in reference to its use by the natives.

ERYTHROPHLEUM, *Afz.*—Natural order, FABACEÆ; sub order, MIMOSEÆ; and tribe, PARKIEÆ, of Lindley.

Generic characters.—*Flowers*, hermaphrodite, regular. *Calyx*, five-limbed, sub-imbricated. *Corolla*, five petals. *Stamens*, perigynous. *Legume*, compressed, bi-valved, and many seeded. (Endlicher, *Gen. Plant.*, p. 1323.) They are tall tropical African trees, with bi-pinnate leaves, opposite folioles, flowering in terminal and lateral racemes.

Erythrophleum judiciale is a large tree with numerous spreading branches, the latter covered with a smooth bark, greyish coloured externally, whilst on the trunk and larger branches the bark is rough, corrugated and fissured, and has a ferruginous red colour, with light coloured excrescences. The *leaves* are bi-pinnated: the pinnæ are articulated oppositely on the general petiole, and vary from three to six or seven pairs, according as they are taken from near the flowering terminus of a branch, or below. The terminal pinnæ are longer, and the folioles larger than those near the base of the leaf. The *leaflets* are sub-petiolate, obliquely ovate and acuminate, from one to three inches long, alternate or in pairs nearly opposite,

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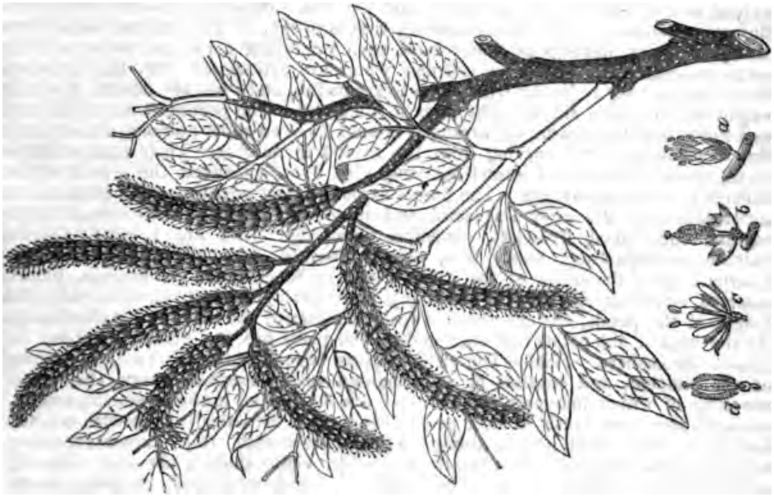
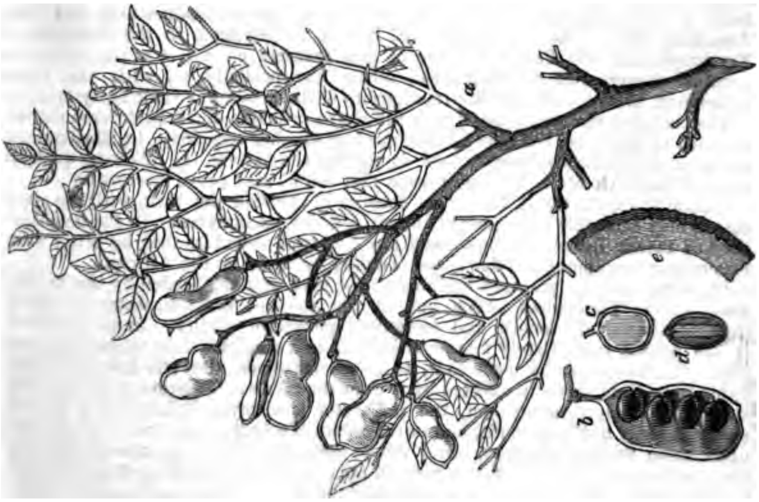
* From the red colour of the bark.



a. A perfect flower. *b.* Calyx spread open, showing the pistil and nectaries. *c.* Flower spread open and pistil removed, with the position of two of the stamens exhibited. *d.* Section of the pistil.



smooth, entire, coriaceous, and varying from three to five or six on a side. The bark of the twigs and younger branches is covered with light coloured dots, which extend to the bases of the peduncles and petioles. *Inflorescence.*—The Sassy tree flowers in compound spike-like racemes; that is to say, all the terminal buds, often thirty or forty, develop as flower buds, each producing a raceme, so as to form large panicles. The spikes or racemes which are articulated with the branched flower-stems, vary in length from three to six inches, and when the flowers are fully expanded, are from six to eight lines in diameter. The peduncles are cylindrical and fluted, and the flowers are arranged around them on short pedicels, about half a line to a line in length, varying from 100 to 400 in number. Their close arrangement, short pedicels and exsert stamens, give them somewhat the aspect of the catkins of some amentaceæ. The florets expand nearly equally, which gives to the inflorescence of the sassy a graceful and plume-like aspect. FLOWERS.—*Calyx* regular, cup-shaped, five-cleft, tomentose externally. (See Fig. 1, *a b.*) *Corolla*, valvate in expanding, petals five, oblong obovate, very tomentose exteriorly, alternate with the limbs of the calyx. (*a c.*) *Stamens* ten, perigynous, exsert, inserted on either side of the petals (*c*), filaments cylindrical, smooth, twice the length of the petals, anthers ovoid, two-lobed, yellow, and dehisce longitudinally. At the base of the petals and surrounding the pistil are five glands (*b*) about the size of the anthers. *Pistil.*—The pistil projects beyond the corolla (*a b*), is as long as the stamens, and consists of an elongated very tomentose ovary, the woolly covering of which increases its diameter one half; and a stigma sessile, conical, smooth, about one-sixth as long as the ovary, and furnished at top with a round foramen. When sliced longitudinally the ovules are visible. (*d.*) *Legumes* from two to four inches long, and from one to two wide, violin shaped, chestnut coloured, coriaceous, compressed, obtuse at both ends when fully developed, bivalved, two to five-seeded, and dehisce by the dorsal suture. *Seeds* have an oblong oval flattened shape, are black, and covered with a very gummy transparent substance, analogous to cerasin. The episperm is hard and horny, enclosing a tough, hard, light grey albumen, nearly surrounding the cotyledons, which are compressed, indurated, and of a yellowish-green colour.

One of the features of this species Erythrophleum is the sparsity of fruit compared with the abundance of inflorescence, as may be observed by comparing figures 1 and 2. The former represents but one branch of a terminal panicle of flowers; the latter, all the fruit of the whole panicle that reached maturity. This habit is quite common, however, as noticed in the horse-chestnut, and other American trees. The remark of Mr. Brown, in reference to the æstivation of Erythrophleum and Parkia, is true of this species; on a few of the spikes the terminal flowers had not expanded, others but partially so, with the stigma protruding, in which the valvate relationship of the petals was sufficiently apparent.

The chemical researches relative to the active principle of the bark have not been resumed at this time, but may be continued on another occasion. In illustration of the singular use to which sassy bark is put by the natives, the following quotation from Winterbottom's *Sierra Leone* (page 129, vol. i.) may prove interesting:—

"Upon the Gold Coast, the ordeal consists in chewing the bark, with the prayer that it may cause his [the accused] death, if he be not innocent. In the neighbourhood of Sierra Leone, the most usual mode of trial resembles that by bitter water, formerly in use among the Jews, and is called *red water* by the Africans.

"The red water is prepared by infusing the bark of a tree, called by the Bulloms, *kwon*, by the Timmanees, *okwon*, and by the Soosoos, *millee*, in water, to which it imparts a powerfully emetic and sometimes purgative quality. In some instances it has proved immediately fatal, which leads to a suspicion that occasionally some other addition must be made to it, as it does not appear that the delicate are more liable to be thus violently affected by it than the robust. To prevent, however, any suspicion of improper conduct, the red water is always administered in the most public manner in the open air, and in the midst of a large concourse of people, who, upon these solemn occasions, never fail to assemble from all quarters, particularly the women, to whom it affords as good an opportunity of displaying their finery and taste in dress, as a country wake in England does to the neighbouring females. The accused is placed on a kind of stool three feet high, one hand being held up, and the other on his thigh, and beneath the seat are spread a number of fresh plantain-leaves. A circle of about seven or eight feet in diameter is formed around the prisoner, and no one is admitted within it but the person who prepares the red water. The bark is publicly exposed, to show that it is genuine. The operator first washes his own hands, and then the bark, as well as the mortar and pestle with which it is to be powdered, to prove that nothing improper is concealed therein. When powdered, a calabash full is mixed in a large brass-panful of water, and is stirred quickly with a kind of whisk, until covered with a froth like a lather of soap. A variety of ceremonies and prayers are performed at the same time, and the accused is repeatedly and solemnly desired to confess the crime with which he has been charged. A little before he begins to drink the infusion, he is obliged to wash his mouth and spit the water out, to show that he has nothing concealed in it; a little rice or piece of kola is then given him to eat, being the only substance he is allowed to take for twelve hours previous to the trial; and in order to prevent his obtaining anything else, he is narrowly watched by a number of people, who are responsible for his conduct. After having repeated a prayer dictated to him, which contains an imprecation upon himself if he be guilty, the red water is administered to him in a calabash capable of holding about half a pint, which he empties eight, ten, or a dozen times successively as quick as it can be filled. It probably now begins to exert its emetic powers, but he must, notwithstanding, persist in drinking, until the rice or kola be brought up, which is easily seen upon the plantain-leaves spread below. Should vomiting not be caused, and the medicine produce purgative effects, the person is condemned immediately; or if it be suspected that the whole of what he has eaten is not brought up, he is permitted to retire, but with this reserve, that if the medicine produce no effect on his bowels until next day at the same hour, he is then and not before pronounced innocent, otherwise he is pronounced guilty. When the red water proves purgative, it is termed 'spoiling the red water.' The utmost quantity which may be swallowed is sixteen calabashfuls; if these have not the desired effect, the prisoner is not allowed to take any more. When neither vomiting nor purging are produced, the red water causes violent pains in the bowels, which are considered as marks of guilt. In such cases they endeavour to recover the patient by exciting vomiting, and to sheathe the acrimony of the red water they give him raw eggs to swallow. In some instances the person has died after drinking the fourth calabash.

"When the accused is permitted to leave the tripod upon which he is seated, he is ordered to move his arms and legs to show that he has not lost the use of them. When he dies upon the spot, which frequently happens, or when the red water is *spoiled*, and the party is too old to sell, one of his family, unless he can redeem himself with a slave, is taken and sold."—*American Journal of Pharmacy.*

ROYAL INSTITUTION OF GREAT BRITAIN.

Friday, June 6, 1856.

COMPARATIVE VIEW OF THE CLEAVAGE OF CRYSTALS AND SLATE ROCKS.

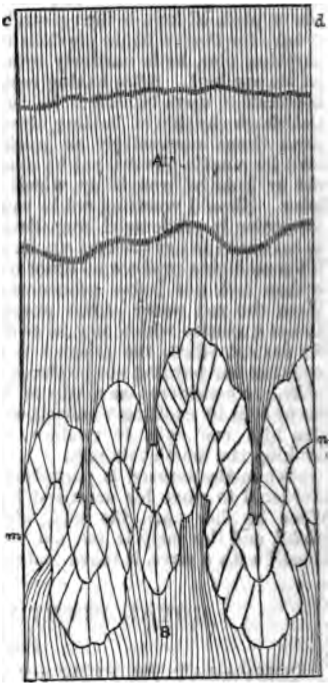
BY JOHN TYNDALL, ESQ., F.R.S.,

Professor of Natural Philosophy in the Royal Institution.

(*Continued from page* 194.)

THE first step in an inquiry of this kind is to put oneself into contact with nature to seek facts. This has been done, and the labours of Sharpe (the late President of the Geological Society, who, to the loss of science and the sorrow of all who knew him, has so suddenly been taken away from us), Sorby, and others have furnished us with a body of evidence which reveals to us certain important physical phenomena, associated with the appearance of slaty cleavage, if they have not produced it; the nature of this evidence we will now proceed to consider.

Fossil shells are found in these slate-rocks. I have here several specimens of such shells, occupying various positions with regard to the cleavage planes. They are squeezed, distorted, and crushed. In some cases a flattening of the convex shell occurs, in others the valves are pressed by a force which acted in the plane of their junction, but in all cases the distortion is such as leads to the inference that the rock which contains these shells has been subjected to enormous pressure in a direction at right angles to the planes of cleavage; the shells are all flattened and spread out upon these planes. I hold in my hand a fossil trilobite of normal proportions. Here is a series of fossils of the same creatures which have suffered distortion. Some have lain across, some along, and some oblique to the cleavage of the slate in which they are found; in all cases the nature of the distortion is such as required for its production a compressing force acting at right angles to the planes of cleavage. As the creatures lay in the mud in the manner indicated, the jaws of a gigantic vice appear to have closed upon them, and squeezed them into the shape you see. As further evidence of the exertion of pressure, let me introduce to your notice a case of contortion which has been adduced by Mr. Sorby. The bedding of the rock shown in this figure was once horizontal; at A we have a deep layer of mud, and at *m n* a layer of comparatively unyielding gritty material; below that again, at B, we have another layer of the fine mud of which slates are formed. This mass cleaves along the shading lines of the diagram: but look at the shape of the intermediate bed: it is contorted into a serpentine form, and leads irresistibly to the conclusion that the mass has been pressed together at right angles to the planes of cleavage. This action can be experimentally imitated, and I have here a piece of clay in which this is done, and the same result produced on a small scale. The amount of compression, indeed, might be roughly estimated by supposing this contorted bed *m n* to be stretched out, its length measured and compared with the distance *c d;* we find in this way that the yielding of the mass has been considerable.



Let me now direct your attention to another proof of pressure; you see the varying colours which indicate the bedding on this mass of slate. The dark portion, as I have stated, is gritty, and composed of comparatively coarse particles, which, owing to their size, shape, and gravity, sink first, and constitute the bottom of each layer. Gradually, from bottom to top the coarseness diminishes, and near the upper surface of each layer we have a mass of comparatively fine clean mud. Sometimes this fine mud forms distinct layers in a mass of slate-rock, and it is the mud thus consolidated from which are derived the German razor-stones, so much prized for the sharpening of surgical instruments. I have here an example of such a stone. When a bed is thin, the clean white mud is permitted to rest, as in this case, upon a slab of the coarser slate in contact with it. When the bed is thick, it is cut into slices which are cemented to pieces of ordinary slate, and thus rendered stronger. The mud thus deposited sometimes in layers is, as might be expected, often rolled up into nodular masses, carried forward, and deposited by the rivers from which the slate-mud has subsided. Here, indeed, are such nodules enclosed in sandstone. Everybody who has ciphered upon a school-slate must remember the whitish-green spots which sometimes dotted the surface of the slate; he will remember how his slate-pencil usually slid over such spots as if they were greasy; now these spots are composed of the finer mud, and they could not, on account of their fineness, *bite* the pencil like the surrounding gritty portions of the slate. Here is a beautiful example of the spots: you observe them on the cleavage surface in broad patches; but if this mass has been compressed at right angles to the planes of cleavage, ought we to expect the same marks when we look at the edge of the slab? The nodules will be flattened by such pressure, and we ought to see evidence of this flattening when we turn the slate edgeways. Here it is. The section of a nodule is a sharp elipse with its major axis parallel to the cleavage. There are other examples of the same nature on the table; I have made excursions to the quarries of Wales and Cumberland, and to many of the slate-yards of London, but the same fact invariably appears, and thus we elevate a common experience of our boyhood into evidence of the highest significance as regards one of the most important problems of geology. In examining the magnetism of these slates, I was led to infer that these spots would contain a less amount of iron than the surrounding dark slate. The analysis was made for me by Mr. Hambly, in the laboratory of Dr. Percy at the School of Mines. The result which is stated in this table justifies the conclusion to which I have referred.

ANALYSIS OF SLATE.

Purple Slate, two analyses.		*Greenish Slate.*	
1. Percentage of iron.........	5.85	1. Percentage of iron.........	3.24
2. " "	6.13	2. " "	3.12
Mean...	5.99	Mean...	3.18

The quantity of iron in the dark slate immediately adjacent to the greenish spot is, according to these analyses, nearly double the quantity contained in the spot itself. This is about the proportion which the magnetic experiments suggested.

Let me now remind you that the facts which I have brought before you are typical facts—each is the representative of a class. We have seen shells crushed; the unhappy trilobites squeezed, beds contorted, nodules of greenish marl flattened; and all these sources of independent testimony point to one and the same conclusion, namely, that slate-rocks have been subjected to enormous pressure in a direction at right angles to the planes of cleavage.[*]

In reference to Mr. Sorby's contorted bed, I have said that by supposing it to be stretched out and its length measured, it would give us an idea of the amount of yielding of the mass above and below the bed. Such a measurement, however, would not quite give the amount of yielding; and here I would beg your attention to a point, the significance of which has, so far as I am aware of, hitherto escaped attention. I hold in my hand a specimen of slate with its bedding marked upon it; the lower portions of each bed are composed of a comparatively coarse gritty material, something like what you may suppose this contorted bed to be composed of. Well, I find that the cleavage takes a bend in crossing these gritty portions, and that the tendency of these portions is to cleave more at right angles to the bedding. Look to this diagram: when the forces commenced to act, this intermediate bed, which though comparatively unyielding is not entirely so, suffered longitudinal pressure; as it bent, the pressure became gradually more lateral, and the direction of its cleavage is exactly such as you would infer from a force of this kind—it is neither quite across the bed, nor yet in the same direction as the cleavage of the slate above and below it, but intermediate between both. Supposing the cleavage to be at right angles to the pressure, this is the direction which it ought to take across these more unyielding strata.

Thus we have established the concurrence of the phenomena of cleavage and pressure—that they accompany each other; but the question still remains, Is this pressure of itself sufficient to account for the cleavage? A single geologist, as far as I am aware, answers boldly in the affirmative. This geologist is Sorby, who has attacked the question in the true spirit of a physical investigator. You remember the cleavage of the flags of Halifax and Over Darwin, which is caused by the interposition of plates of mica between the layers. Mr. Sorby examines the structure of slate-rock, and finds plates of mica to be a constituent. He asks himself, what will be the effect of pressure upon a mass containing such plates confusedly mixed up in it? It will be, he argues, and he argues rightly, to place the plates with their flat surfaces more or less perpendicular to the direction in which the pressure is exerted. He takes scales of the oxide of iron, mixes them with a fine powder, and on squeezing the mass finds that the tendency of the scales is to set themselves at right angles to the line of pressure. Now the planes in which these plates arrange themselves will, he contends, be those along which the mass cleaves.

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[*] While to my mind the evidence in proof of pressure seems perfectly irresistible, I by no means assert that the manner in which I have stated it is incapable of modification. All that I deem important is the fact that pressure has been exerted; and provided this remain firm, the fate of any minor portion of the evidence by which it is here established is of comparatively little moment.

I could show you by tests of a totally different character from those applied by Mr. Sorby, how true his conclusion is, that the effect of pressure on elongated particles or plates will be such as he describes it. Nevertheless, while knowing this fact, and admiring the ability with which Mr. Sorby has treated this question, I cannot accept his explanation of slate-cleavage. I believe that even if these plates of mica were wholly absent, the cleavage of slate-rocks would be much the same as it is at present.

I will not dwell here upon minor facts—I will not urge that the perfection of the cleavage bears no relation to the quantity of mica present—but I will come at once to a case which, to my mind, completely upsets the notion that such plates are a necessary element in the production of cleavage.

Here is a mass of pure white wax: there are no mica particles here; there are no scales of iron, or anything analogous mixed up with the mass. Here is the self-same substance submitted to pressure. I would invite the attention of the eminent geologists whom I see before me to the structure of this mass. No slate ever exhibited so clean a cleavage; it splits into laminæ of surpassing tenuity, and proves at a single stroke that pressure is sufficient to produce cleavage, and that this cleavage is independent of the intermixed plates of mica assumed in Mr. Sorby's theory. I have purposely mixed this wax with elongated particles, and am unable to say at the present moment that the cleavage is sensibly affected by their presence—if anything, I should say they rather impair its fineness and clearness than promote it.

The finer the slate the more perfect will be the resemblance of its cleavage to that of the wax. Compare the surface of the wax with the surface of this slate from Borrowdale in Cumberland. You have precisely the same features in both: you see flakes clinging to the surfaces of each, which have been partially torn away by the cleavage of the mass: I entertain the conviction that if any close observer compares these two effects, he will be led to the conclusion that they are the product of a common cause.*

But you will ask me how, according to my view, does pressure produce this remarkable result. This may be stated in a very few words.

Nature is everywhere imperfect! The eye is not perfectly achromatic, the colours of the rose and tulip are not pure colours, and the freshest air of our hills has a bit of poison in it. In like manner, there is no such thing in nature as a body of perfectly homogeneous structure. I break this clay which seems so intimately mixed, and find that the fracture presents to my eyes innumerable surfaces along which it has given way, and it has yielded along these surfaces because in them the cohesion of the mass is less than elsewhere. I break this marble, and even this wax, and observe the same result: look at the mud at the bottom of a dried pond; look to some of the ungravelled walks in Kensington Gardens on drying after rain—they are cracked and split, and other circumstances being equal, they crack and split where the cohesion of the mass is least. Take then a mass of partially consolidated mud. Assuredly such a mass is divided and subdivided by surfaces along which the cohesion is comparatively small. Penetrate the mass, and you will see it composed of numberless irregular nodules bounded by surfaces of weak cohesion. Figure to your mind's eye such a mass subjected to pressure—the mass yields and spreads out in the direction of least resistance;† the little nodules become converted into laminæ, separated from each other by surfaces of weak cohesion, and the infallible result will be that such a mass will cleave at right angles to the line in which the pressure is exerted.

Further, a mass of dried mud is full of cavities and fissures. If you break dried pipeclay you see them in great numbers, and there are multitudes of them so small that you cannot see them. I have here a piece of glass in which a bubble was enclosed; by the compression of the glass the bubble is flattened, and the sides of the bubble approach each other so closely as to exhibit the colours of thin plates. A similar flattening of the cavities must take place in squeezed mud, and this must materially facilitate the cleavage of the mass in the direction already indicated.

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* I have usually softened the wax by warming it, kneading it with the fingers, and pressed it between thick plates of glass previously wetted. At the ordinary summer temperature the wax is soft, and tears rather than cleaves; on this account I cool my compressed specimens in a mixture of pounded ice and salt, and when thus cooled they split beautifully.

† It is scarcely necessary to say that if the mass were squeezed equally in *all* directions no laminated structure could be produced; it must have room to yield in a lateral direction.

Although the time at my disposal has not permitted me to develop this thought as far as I could wish, yet for the last twelve months the subject has presented itself to me almost daily under one aspect or another. I have never eaten a biscuit during this period in which an intellectual joy has not been superadded to the more sensual pleasure, for I have remarked in all such cases cleavage developed in the mass by the rolling-pin of the pastrycook or confectioner. I have only to break these cakes, and to look at the fracture, to see the laminated structure of the mass; nay, I have the means of pushing the analogy further. I have here some slate which was subjected to a high temperature during the conflagration of Mr. Scott Russell's premises. I invite you to compare this structure with that of a biscuit; air or vapour within the mass has caused it to swell, and the mechanical structure it reveals is precisely that of a biscuit. I have gone a little into the mysteries of baking while conducting my inquiries on this subject, and have received much instruction from a lady friend in the manufacture of puff-paste. Here is some such paste baked in this house under my own superintendence. The cleavage of our hills is accidental cleavage, but this is cleavage with intention. The volition of the pastrycook has entered into the formation of the mass, and it has been his aim to preserve a series of surfaces of structural weakness, along which the dough divides into layers. Puff-paste must not be handled too much, for then the continuity of the surfaces is broken; it ought to be rolled on a cold slab, to prevent the butter from melting, and diffusing itself through the mass, thus rendering it more homogeneous and less liable to split. This is the whole philosophy of puff-paste; it is a grossly-exaggerated case of slaty cleavage.

As time passed on cases multiplied, illustrating the influence of pressure in producing lamination. Mr. Warren De la Rue informs me that he once wished to obtain white-lead in a fine granular state, and to accomplish this he first compressed the mass: the mould was conical, and permitted the mass to spread a little laterally under the pressure. The lamination was as perfect as that of slate, and quite defeated him in his effort to obtain a granular powder. Mr. Brodie, as you are aware, has recently discovered a new kind of graphite: here is the substance in powder, of exquisite fineness. This powder has the peculiarity of clinging together in little confederacies; it cannot be shaken asunder like lycopodium; and when the mass is squeezed these groups of particles flatten, and a perfect cleavage is produced. Mr. Brodie himself has been kind enough to furnish me with specimens for this evening's lecture. I will cleave them before you: you see they split up into plates which are perpendicular to the line in which the pressure was exerted. This testimony is all the more valuable, as the facts were obtained without any reference whatever to the question of cleavage.

I have here a mass of that singular substance Boghead cannel.* This was once a mass of mud, more or less resembling this one, which I have obtained from a bog in Lancashire. I feel some hesitation in bringing this substance before you, for, as in other cases, so in regard to Boghead cannel, science—not science, let me not libel it, but the quibbling, litigious, money-loving portion of human nature speaking through the mask of science—has so contrived to split hairs as to render the qualities of the substance somewhat mythical. I shall therefore content myself with showing you how it cleaves, and with expressing my conviction that pressure had a great share in the production of this cleavage.

The principle which I have enunciated is so simple as to be almost trivial; nevertheless, it embraces not only the cases I have mentioned, but, if time permitted, I think I could show you that it takes a much wider range. When iron is taken from the puddling furnace it is a more or less spongy mass; it is at a welding heat, and at this temperature is submitted to the process of rolling: bright smooth bars such as this are the result of this rolling. But I have said that the mass is more or less spongy or nodular, and, notwithstanding the high heat, these nodules do not perfectly incorporate with their neighbours: what then? You would say that the process of rolling must draw the nodules into fibres—it does so; and here is a mass acted upon by dilute sulphuric acid, which exhibits in a striking manner this fibrous structure. The experiment was made by my friend Dr. Percy, without any reference to the question of cleavage.

Here are other cases of fibrous iron. This fibrous structure is the result of mechanical treatment. Break a mass of ordinary iron and you have a granular fracture; beat the mass, you elongate these granules, and finally render the mass fibrous. Here are pieces of rails along which the wheels of locomotives have slided;* the granules have yielded and become plates. They exfoliate or come off in leaves; all these effects belong, I believe, to the great class of phenomena of which slaty cleavage forms the most prominent example.†

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* For which I have to thank Mr. George Edmondson.

Thus, ladies and gentlemen, we have reached the termination of our task. I commenced by exhibiting to you some of the phenomena of crystallization. I have placed before you the facts which are found to be associated with the cleavage of slate rocks. These facts, as finely expressed by Helmholtz, are so many telescopes to our spiritual vision, by which we can see backward through the night of antiquity, and discern the forces which have been in operation upon the earth's surface

"Ere the lion roared,
Or the eagle soared."

From evidence of the most independent and trustworthy character, we come to the conclusion that these slaty masses have been subjected to enormous pressure, and by the sure method of experiment we have shown—and this is the only really new point which has been brought before you—how the pressure is sufficient to produce the cleavage. Expanding our field of view, we find the self-same law, whose footsteps we trace amid the crags of Wales and Cumberland, stretching its ubiquitous fingers into the domain of the pastrycook and ironfounder; nay, a wheel cannot roll over the half-dried mud of our streets without revealing to us more or less of the features of this law. I would say, in conclusion, that the spirit in which this problem has been attacked by geologists, indicates the dawning of a new day for their science. The great intellects who have laboured at geology, and who have raised it to its present pitch of grandeur, were compelled to deal with the subject in mass, they had no time to look after details. But the desire for more exact knowledge is increasing; facts are flowing in, which, while they leave untouched the intrinsic wonders of geology, are gradually supplanting by solid truths the uncertain speculations which beset the subject in its infancy. Geologists now aim to imitate, as far as possible, the conditions of nature, and to produce her results; they are approaching more and more to the domain of physics, and I trust the day will soon come when we shall interlace our friendly arms across the common boundary of our sciences, and pursue our respective tasks in a spirit of mutual helpfulness, encouragement, and goodwill.

THE EARLY CLOSING MOVEMENT—CHEMISTS' ASSISTANTS.

TO THE EDITOR OF "THE DAILY TELEGRAPH."

SIR,—In your impression of Wednesday you quote Mr. Lilwall's letter to Chemists and Druggists, in behalf of the extension of early closing. No class of young men are more deserving, or stand in greater need of the benefits such a practice would afford, than Chemists' assistants ; the very nature of their profession is such as to require the utmost tension of the mental faculties, in order accurately to discharge so important a duty as that of dispensing medicines. It will be obvious to all, that in order to relieve the monotony and anxiety the continual discharge of such onerous duties entail, occasional relaxation is not only advisable, but essentially requisite. It becomes, therefore, an important question how this is to be best obtained. It will be in the recollection of some that, in conjunction with the promoters of the early closing movement, an attempt was made about two years ago, by Chemists, to bring about this great desideratum, and that it proved a failure simply because we placed ourselves in a somewhat antagonistic position to our employers. It must be borne in mind that we stand in a very different position to tradesmen generally. Reputation is something with everybody, but it is everything with the Chemist; and this can only be gained by strict attention to his duties, and by being always at his post. We are in fact the public slaves, and both night and day at the "beck and call" of every one, and unfortunately, this state of things is necessary and inevitable. If the Chemist quits his post without leaving a competent representative, he endangers his reputation and damages his business; and, as few Chemists keep more than one assistant, the difficulties which stand in the way of anything like a general and systematic adoption of early closing are, as compared with other branches of trade, much greater. Ours is a special case, and requires a different mode of procedure.

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* For these specimens and other valuable assistance I am indebted to Mr. Williams.

† An eminent authority informs me that he believes these surfaces of weak cohesion to be due to the interposition of films of graphite, and not to any tendency of the iron itself to become fibrous: this of course does not in any way militate against the theory which I have ventured to propose. All that the theory requires is surfaces of weak cohesion, however produced, and a change of shape of such surfaces consequent on pressure or rolling.

The plan I suggest to my fellow-assistants is "individual action." To speak in a manly, open, candid manner to their employers, stating the motives which impel them to such a course, and respectfully urge upon them the necessity of allowing time for recreation and study, and I am persuaded we should succeed. In my own case it has been successful, and other assistants of my acquaintance have tried the plan with the same result. We have half a day each week, and every alternate Sunday, at our disposal, besides an occasional hour or two when convenient. I firmly believe that by adopting this plan we should gain our purpose.

Your obedient servant,

September 2. A CHEMIST'S ASSISTANT.

SPONTANEOUS COMBUSTION. (?)

TO THE EDITOR OF "THE TIMES."

SIR,—The report of spontaneous fires in Bedford, as given in your columns a short time ago, has naturally given rise to many conjectures and theories. Among these, one of the more remarkable is that the whole affair may be regarded as little better than a hoax; others obstinately adhere to their groundless and uncharitable suspicion that the fires resulted from some mischievous design; while others, again, assert that the medical men and others who regarded the various outbreaks as something extraordinary must have laboured under some delusion or imposition. Under these circumstances, I shall feel obliged if I may briefly explain the results at which I have arrived after a careful investigation of the whole affair.

To prevent mistake, it must be observed that the first fire was clearly the result of burning sulphur with phosphoric matches. The ignited sulphur overflowed the vessel containing it, and set fire to a bassinette. Of this there can be no doubt. But afterwards other fires broke out, and were witnessed by myself and many other observers—in broad daylight, observe—and, as I am perfectly convinced, without any contact of flame. I have come to the conclusion that the cause of these fires must be found in a compound formed by the combustion of phosphorus and sulphur; that this compound, in vapour, pervaded the house, especially the linen and other textile fabrics, and "spontaneously" (*i.e.*, without contact of flame) ignited at various intervals.

A distinguished Chemist, assuming that a considerable number of phosphorus lucifer matches must have been used, gives the following explanation:—viz., that the combustion of the phosphorus of the matches formed phosphoric acid, which was decomposed by the sulphurous acid of the burning sulphur into phosphorus or oxide of phosphorus, both of which will fire spontaneously when, in a fine state, they are exposed to the atmospheric air.

It will be observed that the only point in which anything is assumed more than is proved by the evidence, is that of the quantity of the matches burnt. The lady residing in the house and her servant stated, in evidence before the coroner, that only "three or four" matches were used to set fire to the sulphur. But with so small a number it is impossible to conceive that the sulphur could have been so effectually fired. I have repeatedly tried the experiment, and have not been able to produce such a combustion of sulphur, even with twenty times the said number of matches.

During my experiments on this question I have become acquainted with a compound by which any textile fabric may be so affected as to ignite spontaneously when exposed to the air; and I have been struck by the resemblance of this combustion and its accompanying odour to the phenomena observed in the house in Horne Lane. For obvious reasons I reserve further explanations; but it appears to me very probable that ere long it will be discovered that, under certain favourable circumstances, a compound may be formed, readily capable of producing such fires as those which were recently witnessed in this town. I am, &c.,

Bedford, *Sept.* 13. T. Herbert Barker, M.D.

[If Dr. Barker can give a rational explanation of the phenomena adverted to in accordance with the view he has taken of the subject, we are at a loss to understand what "obvious reasons" should deter him from doing so.—Ed. *Pharm. Journ.*]

SALE OF POISONS.

TO THE EDITOR OF THE TIMES.

Sir,—I was much gratified on perusing your excellent leader of the 22nd instant on the recent trial of Jane Newton for having administered arsenic to her husband, with intent to murder him. I entirely concur in your views as to the necessity of restricting the sale of this terrible poison. Having devoted some time to examining the evils resulting to society from the indiscriminate sale of all classes of poisons, and having also submitted to Government suggestions for improvements in the law for better regulating their sale, I claim the indulgence, through the medium of your columns, to lay before your readers a few facts not generally known.

The following analysis of deaths from poison in England alone, taken from the Registrar-General's Reports for six years past, shows some of the results arising from the present system :—

Years.	Males.	Females.	Total.
1848	308	261	569
1849	290	236	526
1850	304	249	553
1851	275	253	528
1852	253	300	553
1853	270	219	489
Total deaths in six years	1700	1518	3218

Here, then, the startling fact appears that 536 persons upon an average are annually poisoned—ten in every week, or one in every sixteen hours, irrespective of those who die from the same means (whose true cause of death is only known to those who possess the dreadful secret of murder), and are registered with those who die from "cause unknown," "sudden death," or by the "visitation of God."

On examination of the books of the General Hospital in Birmingham, I find that sixty-three cases of poisoning had occurred in eight years, and out of that number arsenic had only been used in three instances. The number of females was 42, and males 21. The deaths out of that number were only five, making, in round numbers, one death to every twelve cases of poisoning. It will not, I think, be unreasonable to infer that the average deaths from poison, in proportion to those who have been the subjects of poison, will be the same throughout the country—viz., one in every twelve. According, then, to this computation, we have another important fact, that 6432 persons of all ages annually either take poison themselves, or have it administered to them by others, and almost in every instance avowedly for the purposes of self-destruction or murder by other parties.

The question which naturally arises for solution is—What are the causes? They may be divided into two classes—primary and secondary ; the one, which human agency may control or mitigate to some extent, but not entirely subdue, are diversified in their character, in each individual case, emanating either from an idea, a desire, or a circumstance, uncontrolled and unrestrained by the higher and better qualities of man's moral nature ; the other arising from the facilities afforded for giving effect to such idea, desire, or circumstance. It is with secondary causes, then, that we have to deal, and I apprehend there are but few persons but will admit that the unrestricted sale of poisons is one great secondary cause.

In 1831 the number of chemists and druggists in England was 5835, while in 1851 there were 3632 men and 12 women carrying on business under the age of twenty years, and 11,701 men and 298 women of twenty years of age and upwards (exclusive of 15,163 surgeons and apothecaries), making a grand imperial host of arsons, unrestricted, uncontrolled, and irresponsible, with a stock in trade to depopulate the whole continent of Europe.

resent law for restricting the sale of arsenic was passed in 1851. The number of deaths annually for three years previous to this enactment was for the three subsequent years (inclusive of the year 1851) was 523, the ing only lessened 26 out of 549. This shows that other poisons are resorted deaths from poison are to be lessened by an enactment, all those that are or purchasable should be purchased with difficulty by those persons who hem otherwise than for legitimate purposes. The interests and general safety blic demand a judicious restriction. An act like the present, simply prohibitory provisions, will not encompass the evil. There ought to be one judicial inistrative head invested with authority to grant licences, and armed with wers, who has all the poison shops and poison vendors under his control ect to his official glance, one who will see that the provisions of the act are beyed, or the pains, penalties, and forfeitures rigidly enforced.

2nd of June last I forwarded to Lord Campbell, and also to Lord Palmer- gestions for improving the law, and, from what took place in the House of the 10th of last month, the country may reasonably anticipate that during session the whole system will be under the consideration of Parliament.

at entering into detail and occupying too much space, I may state that the es to be derived from an enactment framed upon the general principles con- the suggestions would be as follows:—

uppression of indiscriminate poison selling as it now exists, and a restriction ilities for the commission of crime.

number of dealers would be diminished; none but respectable parties gister. Great caution would be exercised by the seller, and in most cases ipal (and not the beardless assistant or careless apprentice) would take the ility of sale; parties who required the article for legitimate purposes would difficulty in procuring it from a vendor to whom they were known, while ner would have difficulty and trouble, and would pause ere he committed act in the crime of murder. Sales would be less frequent, fewer cases of would occur; human life be less endangered, and society made more secure.

facilities for discovering the person guilty of administering poison would No person could then purchase poison (no matter how potent and mys- agency) but the name of the purchaser and all other particulars would be sion of the authorities, by means of the quarterly and other returns, thereby detection almost immediate and certain.

evidence of purchase would be conclusive by production of the vendor's book with the purchaser's and witness's signatures thereto. On criminal nesses would be relieved from the painful and often embarrassing position important evidence of the sale to a purchaser, unsupported by any corro- testimony.

ths from accidental poisoning, arising from mistakes on sale, would be pre- nd the vendor would not be liable to dispense a deadly poison instead of a rient.

uming two-thirds of the present number of chemists to obtain certificates, al amount realized would not be far short of £10,000—an amount probably to cover the working expenses of the act, inasmuch as the officers of the evenue department might be employed in giving effect to its operation.

ublic good would be realized by simple means. The consumer would pay as the seller would increase the price of the article sold, on account of paying rtificate.

, however, in conclusion, ask, why should John Jones, the grocer, be com- pay for an annual licence to sell tea by retail, or Widow Smith to vend while David Bolus, who lives on the opposite side of the street, with his lazoned with mortar and pestle, and "has no connexion with any other ells poison to all comers, and is exempt? If it is right that a licence should d to the one to vend a luxury, it cannot be wrong to licence the other to son. If there is no injustice, there is, to say the least, an inequality.

I am, Sir, your most obedient servant,

WALTER WILSON.

-street, Handsworth, Birmingham, Aug. 26.

ACCIDENTAL POISONING BY STRYCHNINE.

An inquest was held Aug. 30th, at the General Hospital, St. Helier's, Jersey, on the body of Jane Dyer, aged 22 years. It appears from the evidence that Esther Tyrrel, an attendant at the hospital, had clandestinely taken some pills from a bottle in the surgery, and four were administered to the deceased, who complained of indisposition.

Robert Maddocks, the man-nurse, said that he was called up at 10 o'clock P.M. to see Jane Dyer, who was suffering from spasms. Dr. Jones came shortly afterwards, and stayed about half an hour; the spasms did not return during that time. He ordered some opium and camphor to be given in case of need. About 12 o'clock the spasms returned, when the dose ordered by Dr. Jones was given, which gave relief, and witness went to bed. Shortly afterwards he was again called, and was told she was dead. The bottle from which the pills had been taken was in the surgery when witness entered the establishment in May, 1855; it was not labelled, and was on the counter. He took two of the pills to try them, but they only produced sickness.

Dr. Jones stated that he never made up a strychnine pill, and none to his knowledge had ever been made there; when they were required for patients they were obtained from a chemist, and were kept by the man-nurse under lock and key; and the only way in which he could account for the pills being in the surgery was, that when the last man-nurse died probably this bottle was taken into the surgery.

From the report of the *post-mortem* examination and the analysis read by Dr. Jones, it appears that traces of strychnine were found; some of the pills contained in the bottle from which those given to deceased were taken also were analyzed, as well as experiments made with them on live rabbits, &c., from which Dr. Jones was of opinion that strychnine had been taken, which produced tetanic spasms and ultimately death.

The verdict of the Jury was, that "Jane Dyer had died from the effects of accidental poisoning, having taken four strychnine pills which had been given to her by Esther Tyrrel, the said Tyrrel being ignorant of the substance of which they were composed."

ACCIDENTAL POISONING BY BLACK DROP.

A MELANCHOLY and fatal accident has occurred at Weymouth, Dorset, by the substitution of "black drop" for "black draught." From the evidence elicited at the inquest, we learn that on Thursday, Sept. 11th, Augustus Broughton, son of Colonel Broughton, living near Weymouth, complained of headache. Mrs. Broughton accordingly wrote to Mr. Barling, chemist, as follows:—"Please send an aperient draught for a child eleven years of age." Mr. Barling being absent, the note was given to one of his apprentices, John Lundie, aged twenty, who told James Barratt, a lad of thirteen, to fill a bottle with "black draught," instead of which he filled it with "black drop," and gave it to Lundie, who labelled it "black draught," and gave it to Mrs. Broughton's maid. At nine o'clock this poor child took the fatal dose from the hands of his mother, and immediately became comatose. Mr. J. Lithgow was sent for, but could render no assistance, and death took place in an hour. A *post-mortem* examination was made by Messrs. Lithgow and Thompson, from which they conclude that the death of the deceased was caused by the administration of a preparation of opium. The following is the verdict of the jury:—"We find that the deceased, Augustus Broughton, came to his death from the effects of a preparation of opium being administered to him instead of black draught, the mistake having occurred through the want of care on the part of John Lundie and James Barratt, two servants in the employ of Mr. Barling, chemist and druggist; and the jury also wish to express their disapprobation of allowing young men in the employ of druggists to dispense medicine until they are properly qualified by experience to do so."

POISON BY MISTAKE.

TO THE EDITOR OF "THE TIMES."

SIR,—The letter of "An Oxford Clergyman," in your paper of to-day, calls for a reply from me. With the spirit of your remarks I fully concur. None can desire more than myself that some measures may be adopted to prevent the fearful accidents which have too frequently occurred. I think, however, that nothing will be devised stronger than the responsibility which heavily weighs on every Druggist's establishment.

"Oxford Clergyman," who is so willing to enlighten the public concerning
y affairs, might have inquired into the facts of the case before committing
paper.
p is a large one, and has been conducted in such a manner as to insure the
of numerous customers, and that from all classes, notwithstanding the
reyed from "two of these poor people that this is not the first mistake that
red;" and the assurances that I have had during the five days which have
ince the melancholy death, convince me that the feeling of confidence
My establishment has consisted for about two years past of two assistants
pprentice John Lundie. In six months the latter will have completed the
is apprenticeship, and from his steady habits, his knowledge of pharmacy
rade in general, I am sure he is quite competent to undertake any situation.
Lundie, so well qualified, I thought myself justified in doing with one
and taking an apprentice. The youth I took, it is true, was young, but of
rior attainments, and well qualified to perform the duties required of him.
ft in my shop an assistant perfectly qualified to perform his duties, an
e within six months of being out of his time, and the youth Barratt, who
me on trial. I was absent from the shop, but on the premises, and within
twenty minutes to one till a quarter to two o'clock, during which time I
inner, and during that time the order from Mrs. Broughton was presented
r which required no further judgment in the matter than merely regulating
A bottle of the proper size was selected to be filled; but, alas! poison
instead.
orrespondent's information extends further than the evidence given at the
That evidence was to the effect that I was able to exculpate myself, for I
he shop in charge of competent assistants. I could show that the aperient
was in its place, properly labelled, and the black drop in its place out of the
l in a cupboard properly labelled, the strength being written in plain
so that on its being shown to one of Colonel Broughton's sons at half-past
Friday morning, he read it across the counter without any difficulty, and I
w that I had recently cautioned the youth as to the strength and dose of
pii.," the drug with which the black drop was compared to indicate its
My assistant was also able to show at the inquest that when the order
was otherwise engaged in the shop. These being the facts, I think I have
request their insertion in *The Times*, to rebut the attacks of the "Oxford
n," which attack I think the sad misfortune which has happened does not

I am, your obedient servant,

uth, *Sept*. 16. THOMAS BARLING.

BOOKS RECEIVED.

ssay on the Prevention of the Smoke Nuisance. By Charles Wye
ams, Ass. Inst. C.E., &c. London: John Weale, 59, High Holborn, 1856.
the Author.)

System of Supporting Artificial Teeth. By Charles Stokes,
.S., Surgeon Dentist. London: John Churchill, New Burlington Street.
(From the Author.)

on the Successful Application of Methylated Spirit *to various pur-*
the Arts, Manufactures, and Scientific Research in 1856. Addressed to the
issioners of Inland Revenue. London: Printed by Eyre and Spottiswoode.

dans le Nord de la Bolivie *et dans les Parties voisines du Pérou, ou Visite*
trict Aurifère de Tipuani. Par H. A. Weddell, M.D., &c. &c. Pp. 574.
Bertrand. London: Baillière.

Chimique de l'Acide Carbonique dans l'Economie Animale. Mémoire
d. Imp. de Médecine. Par M. Mialhe. Pp. 15.

ent de la Maladie de la Vigne. Par M. J. C. Thibault. St.
e. Pp. 47.

Rendu de la Société d'Emulation et de Prévoyance des Pharmaciens
st (*du* 7 *Avril*, 1856), a Lyon. Pp. 29.

TO CORRESPONDENTS.

Dyes from Guano.—A correspondent writes as follows:—"Sir,—While on the Continent lately, I was shown two new dye-stuffs, said to be obtained from 'guano.' The first, *Alloxan*, between a white and primrose colour, and in a crystalline state; if moistened and rubbed on the hand, in about seven to ten minutes it reaches from a beautiful delicate *rose* colour up to an intense *crimson*, difficult to be got off the hand but with ammonia, to which it readily yields. From this is prepared *Murexide*, in appearance like crushed lac (for dyeing); and this, being miscible with water, is the most applicable preparation in dyeing. Being a foreigner, I could not obtain as much information as I could have wished, and therefore must trouble you to give me a few words in your valuable journal concerning them. I noticed in your last that the two aforesaid preparations were exhibited among the 'Chemical Specimens' at the Parisian Exhibition."

[The two substances named have long been known as products derived from uric acid, which is one of the constituents of guano.—Ed.]

S. U. J. (Leamington).—*Valerianate of Zinc* is a pearly white salt, having a faint odour of valerianic acid, and a metallic astringent taste. It is soluble in about 160 parts of cold water, and much more soluble in alcohol. The solution has an acid reaction. If diluted sulphuric acid be added to it, and the mixture distilled, a volatile fatty acid (valerianic acid) passes over, which may be recognised by its smell, and by its not yielding a bluish-white precipitate on being added to a concentrated solution of acetate of copper. On burning some of the salt, oxide of zinc will be obtained, to which the appropriate tests may be applied.

E. E. (Weymouth).—"*Camphine*" is highly-rectified oil of turpentine. There is a patented article sold under the above name, which is made by passing the vapour of oil of turpentine through caustic solutions of potash or soda, or through sulphuric acid.

Grey.—(1.) Take two tablespoonfuls every three hours, if occasion requires.—(2.) Yes.—(3.) Dr. Hofmann is the Professor at the College of Chemistry, which is one of the best schools for Analytical Chemists.—(4.) It is becoming very common for Pharmaceutical Chemists to sell photographic apparatus and chemicals.

Enquirer (Preston).—Seidlitz powders are exempted from stamp duty; the other label alluded to is liable, as the remedy is recommended for a particular complaint.

A Student (Newcastle-on-Tyne).—Beet-Root Sugar.—The following is an outline of the manufacture. The roots are washed, rasped, and pressed. The juice thus extracted is then defecated by boiling it with a portion of slaked lime, but baryta has in some cases been substituted for lime. The defecated syrup is decolourized with animal charcoal, and afterwards concentrated until it crystallizes.

Botanist (Narbeth).—(1.) *London Pharmacopœia*, published by Churchill, 9*s*.—(2.) Ainsworth's *Dictionary*.

J. G. (Lower Clapton).—(1.) Graham's *Modern Domestic Medicine*.—(2). *Tinctura Ferri Persulphatis*. We know of no formula; the persulphate of iron is formed in the process for ferri peroxydum hydratum.

Communications have been received from *Mr. Beaton*, *Mr. Lilwall*, *Mr. J. Leay*, "*A Member*," "*Senex*," *Mr. Pontent*, "*M.R.P.S.*," and *T. B. Groves*, which will receive attention.

Erratum.—In the September number, page 200, lines 10 and 11 should have been placed at the bottom of page 199.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd) to Mr. Churchill, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XVI.—No. V.—NOVEMBER 1st, 1856.

MEDICINE AND PHARMACY IN SWITZERLAND.

The Board of Health.—The Faculty of Medicine.—Colleges of Medicine, Surgery, and Pharmacy.—The Examinations.—The Practice of Pharmacy.—Officers of Health.—The Sale of Poisons.—Secret Medicines.—The Veterinary Art.

No person is permitted by law to practise Medicine, Surgery, Pharmacy, or the Veterinary Art in Switzerland, without a license obtained from, or under the authority of, the Council of State (Conseil d'Etat), such license being granted only after examination, or other evidence of capacity admissible in special cases.

With regard to the precise terms of the law, and the police regulations under which it is enforced, each Canton is under a separate local jurisdiction; but the laws which prevail in the Canton of Geneva may be taken to represent in all essential particulars those of the country generally in the affairs of the medical profession.

No person not a native of the Canton can present himself for examination without the authority of the Council of State.

The examinations are public and gratuitous.

Candidates for examination in Medicine or Surgery must possess a degree of Doctor, or a title equivalent to it in a recognized university or academy. As there are no universities in Switzerland, the profession is dependent upon foreign sources for scientific education.

There is a Board of Health, which, under the authority of the Council of State, watches over everything which relates to the public health and the observance of medical laws and regulations.

THE BOARD OF HEALTH is one of the auxiliary commissions of the department of Justice and Police. It is composed of a Councillor of State (President), a Vice-President of the Faculty of Medicine (Vice-President), a Doctor of Medicine, a Surgeon, and a Pharmacien, elected by the Council of State; a Doctor of Medicine, a Surgeon, and a Pharmacien, elected each by his College; a Veterinary Surgeon, elected by the Council of State. The above members (except the President) are elected for three years, and are re-eligible. The Secretary, unless a member of the Board, must be approved by the Council of State. The Board of Health meets at least once a month, and is summoned by the President. It takes cognizance of all matters relating to the public health and medical law, and is consulted by the Council of State in all departments of medical police. It is the duty of the Board to suggest propositions advantageous to the public health; to take precautions against the prevalence of epidemics and contagious maladies; to promote vaccination, and check small-pox; to superintend the instruction and examination of midwives, dentists, orthopedists, and officers of health, the registration of deaths, the visitation of shops where medicines are sold; to take cognizance of the diseases of cattle, hydrophobia, farcy, and glanders; to suggest preventive measures; to provide for the means to be resorted to in cases of suspended animation from drowning, &c. The Board of Health presents to the Council of State an annual report of its proceedings, which is communicated to the Faculty of Medicine at a general meeting. It also prepares a register of the Doctors, Pharmaciens, and all other persons authorized by law to practise any branch of the healing art. The internal affairs of the Board, with regard to the respective duties of the members, are settled by bye-laws.

The sale of poisons, except in the case of medical prescriptions, is under police regulations. The sale or announcement of secret remedies is forbidden, unless by special authority of the Board of Health. The Board of Health is charged with the responsibility of visiting Pharmaceutical establishments at least once in the year, to ascertain the purity or otherwise of the drugs. These visits are performed by two members, one of whom must be a Pharmacien, and they take place in presence of a Commissioner of Police or the Mayor of the commune. The Board of Health settles the regulations to be observed in reference to drugs or medicinal preparations found to be deteriorated or badly prepared, making a distinction between fraudulent sophistication, want of skill in the preparation, and deterioration by keeping.

THE FACULTY OF MEDICINE is composed of Doctors of Medicine, Doctors of Surgery, and Pharmaciens legally admitted to practise their profession. It is divided into a College of Medicine, a College of Surgery, and a College of Pharmacy. It has a President, being a member of the Council of State, and a Vice-President, elected by the Council of State from the Faculty.

Physicians and Surgeons legally in practice in neighbouring states, and living near the frontier, are admitted to practise within the Canton near their residence, unless individually prohibited by the Council of State.

The Council of State may grant to a Doctor of Medicine, or of Surgery, or a Pharmacien, known by a distinguished practice, the right to establish himself and practise in the canton without passing the examination.

The Faculty of Medicine has a President, being a Member of the Council of State, and a Vice-President, a member of the Faculty, elected by the Council of State. The Faculty meets at the summons of the President, and keeps minutes of its proceedings. The functions of Secretary are performed by the Secretary of the Board of Health, or by a junior member of the Board, or in default by a member of the Faculty appointed by the President. Each College is presided over by the President or Vice-President of the Faculty, or in case of their absence by a member of the College. Each College keeps minutes of its sittings, and all minutes are deposited with the Board of Health.

General Conditions for the three Colleges constituting the Faculty of Medicine.

THE EXAMINATIONS.—Admission to any one of the Colleges (with the exception above stated) is only granted after examination. Candidates for such admission must apply to the President of the Board of Health, and furnish certificates, the validity of which is ascertained by the Board. A Board of Examiners is appointed when occasion requires. The President or the Vice-President of the Board of Health presides, and the President fixes the day and hour of the examination. Each *vivâ voce* examination is of two hours' duration, and is terminated by a vote as to admission or rejection. The President takes the opinion of the Board at the first examination—

1st. Whether the candidate is admitted, and authorized to proceed to the second trial.

2nd. Whether, in case of non-admission, the rejection is absolute, or the examination adjourned to any specified time.

Similar questions are put at each succeeding examination. The Board deliberates with closed doors, the majority deciding each question; but in case of an equality of votes, the examination is adjourned to a future day, not exceeding one month.

The decision of the Board is immediately communicated to the candidate; also to the Council of State by the President.

The admission takes place at a general meeting of the Faculty, and after the announcement by the President the candidate makes a declaration, of which the following is a translation, and attests it with his signature:—"I declare that I am acquainted with the laws and regulations relative to the practice of medicine in the Canton of Geneva, and I undertake to conform to them with honour and loyalty."

President then delivers to the candidate a copy of the register of the l of State, which confers upon him the right to practise in the Canton, cifies to which of the Colleges he is admitted.

Special Regulations for each of the three Colleges.

ICINE.—The Board of Health appoints the Board of Examiners, con- of a Doctor of Medicine and a Surgeon, being members of that board, ee members of the College of Medicine. A Pharmacien, being a mem- the Board of Health, takes a part in the first examination. The Pre- or Vice-President of the Board of Health presides.

candidate passes three examinations on the subjects usually comprised in cal education, which it is needless here to enumerate.

ERY.—The Board of Examiners is constituted like that above mentioned, ting three members of the College of Surgery for three members of the e of Medicine, and the examinations comprise all that is required for a l qualification.

RMACY.—Candidates, unless they have been received by a Foreign School rmacy legally constituted, must pass four years of apprenticeship and ars of study in a Foreign School, or six years of apprenticeship in a acy legally established, two of which at least must be in a Foreign Esta- ent. Two years of study in the Faculty of Sciences or in the second of the preparatory studies of the Academy of Geneva, may count as one a Foreign School.

Board of Health appoints the Board of Examiners, consisting of five rs of the College of Pharmacy, of whom one at least is a member of the of Health. The President or Vice-President of the Board of Health s.

first examination is on general Materia Medica, Botany, Natural His- nd Physics, especially in their application to Pharmacy. This examina- aving been passed, the candidate is required to perform a chemical ana- o be completed by a certain day, in a convenient place appointed by the , a report of which he furnishes in writing. Two members of the Board pointed to confer with the candidate during the process, and to assist in cision as to his merits. The result being satisfactory, the Board proceeds second oral examination, which relates chiefly to Chemistry and its ap- on to Pharmacy. The candidate is then required to perform a chemico- nalysis—such as the detection of a poison in the contents of the stomach— regulations similar to those stated respecting the former analysis; and he rnish a written report describing the process. The second trial having assed, the Board proceeds to the third and last examination, which relates to the practical details of Chemistry and Pharmacy.

PRACTICE OF PHARMACY is exclusive of every other branch of the healing Nevertheless the Council of State may, within such limits as may appear , authorize Physicians and Surgeons in the Canton to prepare and sell ines for those patients who reside in districts where there is no Pharmacien. rsons practising Pharmacy by virtue of this authority, Pharmaciens, ists, and Herboristes, are subject to the established regulations of the of Health with reference to the names and classification of the different and other substances which they keep for sale; and must always be pro- with the weights legally authorized in the Canton.

rmaciens are required to keep copies of all prescriptions which they have sed, retaining the originals for a year at least, unless the author of any iption applies for it, or the patient requires it for use in a foreign country. er of these cases, the Pharmacien retains a copy, with the date, the names patient and the prescriber, so as to be able to refer to it at any future Pharmaciens alone may dispense medical prescriptions, make and sell ations, mixtures of drugs and combinations for medicinal use. They alone can sell retail simple drugs which are poisonous or dangerous, and not used in the arts.

The same Pharmacien cannot be proprietor or director of more than one establishment. In case of decease, or on the demand of a Pharmacien on account of illness or absence, the superintendent or assistant who has the charge of the business must apply to the Board of Health for authority or sanction, which is granted for a limited time after the capability of the applicant has been ascertained. For this purpose the Board of Health appoints three Pharmaciens as examiners, of whom the senior presides; and having subjected the candidate to a general examination in Pharmacy, they furnish a report in writing to the Board of Health.

OFFICERS OF HEALTH (Officiers de Santé) have a limited medical qualification. They are not allowed to perform any important surgical operation without the assistance of a Surgeon, unless in cases of great urgency; and they can only furnish medicines to their patients by the special permission of the Board of Health, and under regulations similar to those in force with regard to Physicians and Surgeons in rural districts. There are only six of this class of practitioners in the Canton of Geneva.

THE SALE OF POISONS.—Poisonous substances and plants must be kept in a separate part of the premises, and cannot be sold without a label stating the name and quality of the substance, the name and address of the vendor, the date, the quantity sold, and the purpose to which it is to be applied. The name in full of the purchaser must be signed in a book provided by a commissioner of police or a mayor; in case the purchaser cannot write, the vendor must attest the fact, and sign for him. Poisons may only be delivered to persons well known to the vendor, unless sanctioned by the written authority of a doctor, an officer of health, a commissioner of police, or a mayor, which evidence must be preserved. These substances cannot be sold to children less than twelve years of age, unless furnished with a written order, properly signed. The registers and written orders must be produced on the requisition of the competent authorities.

These precautions are not applicable to medical prescriptions, written in due form, dated, and signed by a doctor or officer of health; and the entry of wholesale orders in the ledger supersedes the necessity of entry in the poison-book.

The classification of substances and compounds, with reference to the sale of poisons, is defined in five tables, which are ordered to be suspended or fixed in the warehouses of Pharmaciens, Druggists, and Herboristes. They are revised every three years by the Board of Health, and submitted again for the approbation of the Council of State. Principals are responsible for the acts of their assistants.

The regulations relating to the sale of poisons are to be inserted entire at the head of the register of poisons sold.

TABLE I.—*Simple Drugs* (poisons) which only Pharmaciens may sell retail, but which other persons may sell wholesale, under the prescribed regulations.—Aconite, Belladonna, Bryony, Cantharides, Cevadilla, Hemlock, Colchicum, Colocynth, Cocculus Indicus, Stramonium, Digitalis, Euphorbium, Ergot of Rye, St. Ignatius' Bean, Gratiola, Hellebore, Ipecacuanha, Jalap, Henbane, Nightshade, Nux Vomica, Rue, Savine, Scammony, Squill, Staphysacre.

TABLE II. contains a long list of drugs and preparations which may be sold by all persons without restriction.

TABLE III.—*Preparations* (poisons) which only Pharmaciens may sell retail, but which other persons may sell wholesale, as above.—Preparations of Antimony, Silver, Bromine, Iodine, Mercury, Gold, Zinc; Creosote, Cherry-laurel Water, Burnt Sponge, Essence of Bitter Almonds, Essence of Rue, Extract of Rhatany, Croton Oil, Oil of Male-fern, Milk of Sulphur, Magistery of Bismuth, Morphine and its salts, Opium, Caustic Potash, Quinine and its salts, Resin of Jalap, Strychnine and its salts, Veratrine and its salts.

TABLE IV.—*Poisonous Substances* used in the Arts, which may be sold by other persons as well as Pharmaciens, wholesale or retail, but subject to all the precautions of registration in the poison-book, &c.—White, Red, and Yellow Arsenic, Black Arsenic (fly-poison), White Cyanide of Potassium, Iodine and its combinations, Nitrate of Silver, Phosphorus, Corrosive Sublimate.

TABLE V.—*Poisonous Substances* used in the Arts, of which the sale by others as well as Pharmaciens is permitted, subject to the precautions above stated in the first paragraph.—Citric, Muriatic, Nitric, Nitro-muriatic, Oxalic, Tartaric, and Sulphuric Acids; Yellow Prussiate of Potassium, Gamboge, Salt of Sorrel, Sulphate of Copper.

The term wholesale is understood to apply to the sale of articles to those who buy to sell again. Consequently the simple drugs and poisonous or dangerous preparations in Tables I. and III. can only be sold wholesale to Druggists, Pharmaciens, or Medical men.

SECRET REMEDIES.—The announcement or sale of secret remedies without special authority from the Board of Health is strictly prohibited. Every application for such authority must be addressed to the President of the Board of Health, accompanied by the formula and a sample of the remedy. The authority is personal and for a limited period. In case of breach of the conditions, it may be withdrawn at any time. Applications for renewal must be made at least three months before the expiration of the time of the license.

THE VETERINARY ART.—No person is allowed to practise the Veterinary Art without a license of the Council of State. This is granted after the passing of an examination. The Board of Health appoints the Board of Examiners, consisting of a Doctor of Medicine, a Surgeon, a Pharmacien, and two Veterinary Practitioners. The regulations respecting the examination are similar to those above stated with reference to the other branches of the healing art, the subjects being appropriate to the veterinary profession,

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From the above abstract of the laws relating to the medical profession in Switzerland, it will be seen that the precautions adopted for the protection of life and health against the casualties of ignorance, quackery, and poisoning (whether criminal or accidental), are not confined to the higher branches of the medical art, but comprehend all departments of medicine in the broadest sense of the term. The Government takes cognizance of every act performed, and every remedy supplied for the relief and cure of disease, and the Board of Health, comprising some of the most eminent members of the Faculty, is consulted in every case of doubt or difficulty. The general regulations are founded on the medical laws of France, with such modifications as the requirements of the locality rendered necessary. The Board of Health was first appointed in January, 1845.

The division of labour in the profession has had the effect of raising up an intelligent and qualified class of practitioners in each department, the result of which is, as we are informed, that the several duties of all classes are in general satisfactorily performed. Mistakes and accidents are of rare occurrence, and criminal poisoning is kept in check by the precautions under which poisons are sold.

The relative position of medical men and pharmaciens is satisfactory, as they mutually assist each other in the performance of their public and professional duties, while each class maintains its independence. Many years ago the custom of giving medical men a percentage on prescriptions prevailed in a few instances, but this is now altogether discontinued, and any collusion of a mercenary nature is discountenanced as unprofessional. The Vice-President of the Board of Health at the present time is a Pharmacien. Under the circumstances above detailed, it will be seen that sources of jealousy between medical men and the dispensers of their prescriptions scarcely exist. "Counter practice" is not prevalent, except to a very limited extent, in casual and exceptional cases.

While we are enabled on good authority to give a favourable report of the general operation of the laws relating to the medical profession in Switzerland, there is one circumstance of recent occurrence which is a source of some anxiety and dissatisfaction. For several years past the Government has shown a tendency to party bias in the appointments coming within its jurisdiction—in other words, to use professional patronage for raising political capital. This disposition was shadowed forth by degrees in some appointments of minor importance, but did not assume a serious aspect until a recent occurrence brought almost the entire profession into collision with the Government. One of the most eminent physicians in Geneva was, during the early part of the present year, dismissed from an office which he had held for upwards of twenty years, as senior physician to a lunatic asylum. It is needless here to detail the circumstances which were used as a pretext for this act, or to give the names of the parties concerned; but it will be sufficient to state that a memorial, signed by almost the entire medical profession in the Canton of Geneva, was presented to the Physician who had been so displaced, expressing sympathy with him, and reflecting in strong terms on the injustice of the treatment which he had received, and which was attributed entirely to political bias.

The Government resented this candid expression of opinion as an act of insubordination, and dismissed from other offices two of those who had signed the memorial, refusing to sanction the appointment of any who had thus identified themselves with that party. By this act of *despotism* on the part of a *radical* Government, the number of medical men at its disposal for situations in public institutions was reduced to about five, whose politics being on the "liberal" side, and who for obvious reasons had not signed the memorial. In this dilemma, the Government has appointed a Surgeon to the office of Physician to one institution, and has given to one Physician the superintendence of two institutions for want of a second Physician duly qualified, politically as well as professionally. Subordinate offices have been filled on the same principle. This arbitrary conduct has called forth remonstrances and protestations on the part of the profession, and the conflict which ensued has led to a rupture between the Government and the Faculty of Medicine. We are informed that a total repeal of the existing medical laws has been threatened, in which event, the Medical profession would be thrown open, subject only to the will and pleasure of the Government in the distribution of patronage. The public would, of course, suffer as much as the profession if such a state of affairs should continue, as the qualifications of Medical Practitioners must inevitably deteriorate under a Government in whose estimation professional talent and merit have less weight than political subserviency.

LEGISLATION AGAINST POISONING.

We have before us an extensive and rather interesting collection of extracts culled from the newspapers within the last four or five weeks, representing every imaginable shade of opinion on the difficult and, at the present time, exciting question—How can poisoning be prevented? Some of the writers recommend restrictions, varying in intensity, on the sale and use of poisons; others are opposed to any legislative interference; and each argument is founded upon some fact or hypothesis, which, when sifted and viewed under another aspect, wears a different complexion. Hence the conflicting opinions on a subject of the greatest importance to the public, and on which all parties desire the same result—namely, the public safety.

We have also before us in type several fresh cases, to add to the list of recorded poisonings or attempts at poisoning, among which is the case of a man who, failing to obtain poison, jumped out of window. We have not attempted to collect all the instances which have occurred, but merely give a short account of such as have happened to come under our notice.

In contemplating the apparently increasing prevalence of poisoning at the present time, and the corresponding publicity given to all the circumstantial details, with *ex post facto* lectures or essays, showing how in each case the catastrophe might have been prevented, two inquiries naturally suggest themselves:—First, Does this publicity tend to encourage poisoning, by pointing out the various modes in which it may be done? Secondly, Is the prevalence of poisoning to be taken to denote a corresponding increase in the amount of crime, or has science, with the aid of the press, brought to light deeds of darkness which formerly escaped detection, and also substituted a refined and cleanly mode of destruction for the razor, the rope, and the bludgeon? The answer to these questions might afford a clue to the solution of the practical difficulty, namely, the decision as to the mode in which the subject ought to be dealt with by the Legislature.

That the familiarity of the public mind with all the minutiæ and disgusting varieties of crime has an evil tendency, is proved by daily experience. The recurrence of certain offences immediately after an exposure has taken place, leads to the supposition that crime is contagious, and in fact it often assumes the character of an epidemic. But in this age of intellectual improvement, when books and newspapers are read by the million, while the press is free, and a demand exists for exciting information, the notoriety of passing events is unavoidable. The acting of Jack Sheppard may be prohibited, and the publishers of immoral books may be sent to prison, but as long as the police reports are shed forth in all their naked impurity, the criminal student is furnished with a complete clinical course of instruction, of which a comparatively small portion is devoted to the science of poisoning. However undesirable may be the publication of these atrocities, we doubt the practicability of their suppression; but the supply of all commodities being regulated by the demand, the demand for means of destruction will call forth such instruments or expedients as the advancement of art and science for the time being may afford, and consequently the circulation of this kind of knowledge should be discouraged as much as possible. We believe the only practicable check upon the crime consists in throwing obstacles in the way of the clandestine purchase of poison, and devising the most effectual means for its detection. This, then, is the problem to be solved, and the difficulty consists in attaining the object desired, at the same time steering clear of any practical absurdity which would render the scheme inoperative. A correspondent in the *Times* (Oct. 7) makes the following suggestion:—

> "That the sale of certain poisons (to be set forth and specified) be restricted and regulated by another act framed upon the following general principles:—
>
> "That a person be appointed to act as commissioner, to carry the act into operation, with power to make rules, orders, and regulations, and to appoint such officers as he may deem necessary, subject to the approval of Her Majesty's Treasury.
>
> "That no person shall sell any poison restricted by the act without having first obtained a license to sell.
>
> "That the commissioner shall have full power to grant such number of licenses in any one town or place as he may think advisable, regard being had to the number of the inhabitants and their requirements."

Another correspondent (Oct. 9) suggests—

> "That every one inquiring for any quantity of laudanum or other medicine of a poisonous nature (whether in one or more doses) be refused, unless he be accompanied by a friend who can furnish, to the satisfaction of the vendor, full information upon all points respecting which he may think fit to inquire; and further, that before receiving the medicine the purchaser and friend shall enter their names and addresses, and specify the name and quantity of the article supplied, with its intended object, in a book kept for that purpose by the chemist and druggist, such entries being attested by the assistant in attendance.
>
> "All written applications for such medicines must state the purpose for which they

are required, and be endorsed by the authority of some one in the medical profession, whose signature may be authenticated by direct communication in case of any doubt existing as to its being genuine."

Both of these suggestions involve the necessity of adopting a schedule of poisons, and defining the boundary line between dangerous and safe substances. This is attempted in the law relating to poisons in Switzerland, and on reference to the classified list of substances (page 252 of this number) and the list of articles comprised in our Materia Medica and an ordinary druggist's stock, the extreme intricacy of the subject is manifest. It is also too much to expect that every straw bonnet-maker requiring a pennyworth of oxalic acid, or a servant wanting "spirit of salt" for cleaning pans, should obtain a medical certificate.

We have received the following from Mr. Roberton:—

ON THE SALE OF POISONS.

BY MR. JAMES ROBERTON.

An observer of the wants of the age will not fail to perceive that certain important questions in political and social economy are continually coming to the surface, which require to be intelligently and fearlessly dealt with.

In the latter department sanitary science holds an important position, and is engaging a large share of attention. Yet recent events appear to show that precautionary and preventive measures, in a certain direction, have to a considerable extent been practically lost sight of. The indiscriminate and too often reckless supply of poisons to the public, suggests a forcible illustration of this assertion. And this appears to me a question which loudly demands our attention.

That the dispensers and purveyors of the means of cure should be in so many instances the unreflecting and incautious agents of the instrument of death, is an anomaly which at first sight is difficult to conceive.

Whilst such a state of things continues, I venture to assert that a standing reproach is attached to the Pharmaceutical body of this country; and at the present moment, in the estimation of the intelligent and reflecting portion of the public, it may in fact be said to be at a discount. I have repeatedly heard it said that the Chemist is at full liberty with certain precautions, such as labelling, &c., to supply anything which is asked for.

To this, however, I unhesitatingly demur, and reply that in such cases he should lose sight of his commercial relation in the discharge of a moral obligation.

At the present time, the discretionary power of each individual Druggist is the only safeguard recognized; and, excepting in the case of arsenic, the law interposes no barrier. But unless we are faithful to the trust reposed in our hands, the law will assuredly step in, and, it may be, impose a somewhat inconvenient and vexatious restriction. This intimation we have already had. What, then, should be our course? My reply is, let us in this matter, as well as in that of education, take the initiative ourselves. A high responsibility and moral obligation rests upon us as a body. We cannot possibly ignore it. If we attempt to do so we are verily culpable, and shall bring disgrace and discredit upon our profession.

The practical suggestion which I would make is, that the Parmaceutical Society, in its official capacity, should take this matter up. Its influence and power have already been acknowledged by the recent Committee of the House of Commons on the Adulteration of Food and Drugs.

I believe an earnest recommendation from the Council for the total suppression of the sale of those substances which are usually employed in criminal poisoning, addressed to every Pharmaceutical Chemist, and also to every Druggist in the kingdom, would receive the attention which the importance of such a subject deserves.

I do not intimate here the terms on which I think such a suggestion should be framed; but I would simply say, let it be definite and unmistakable in its character, and I cannot but think that it would carry with it, to a large extent, the force and weight of its own necessity.

At all events, I believe that such a protest and recommendation would exert an amount of moral influence which would certainly be productive of good.

111, *Oxford-street, Manchester.*

While we agree with Mr. Roberton in the opinion that the Pharmaceutists themselves ought to take the initiative, we cannot go so far as to recommend the adoption of his sweeping prohibition against the sale of poisonous substances in general. The following is an authentic copy of an order, with the omission of the names and addresses:—

——— *October*, 1856.

Mrs. ——— will thank ——— to send, well packed, so as to bear the railway carriage, to No. ——————— the following articles:—
1 Quart. Imp. of the Solution of the Acetate of Morphia, double the strength of Laudanum
1 Quart of Laudanum
1 Quart of Salvolatile
1 Pint of Sp. Æther. Co.
26 Dozen of the Acetate of Morphia Pills, ½ grain in each pill.

There are few Chemists having an extensive business who have not occasionally received similar orders; and the demand for oxalic acid, "salt of sorrel," white precipitate, sugar of lead, and other poisons, for legitimate purposes, is such as to preclude the possibility of the total suppression of the sale.

Mr. John Beaton takes an opposite view of the subject, and objects to legislation altogether; he says:—

"A great deal has been said and written lately about 'poison selling,' by persons who seem to have very little knowledge of the subject. From my own experience I really cannot see any benefit likely to arise from legislation, while it would produce much inconvenience and annoyance, as so large a portion of our most valuable medicinal agents and chemicals used for the purposes of trade and art, are of a poisonous character, and thus to draw the line for legislation I do not think practicable. I consider the proper remedy is to secure fit and competent persons to discharge the obligation the Chemist owes the public. The Pharmaceutical Society pre-eminently fulfils the important end that was required of it, in correcting ignorance, supplying a high standard of qualification, and thus enlarging moral responsibility. And unfortunately, the Act of Parliament which governs the Society does not *compel* Chemists to be members of the Institution, and therefore many are not subject to its wholesome enactments. If the Legislature will but extend the authority and powers of the Pharmaceutical Society, I believe the great and crying evil of the so-called 'poison selling' would soon have a sound and practical remedy.

"174, *Shoreditch*, *Sept.*, 1856."

One of the most practical and well-written articles which we have seen on the subject is a letter to the *Times* of Sept. 19, signed F. E. P., Bath. The author need not have hesitated to append his name to a document which shows on the face of it evidence of much experience and reflection, and which we think it desirable to republish:—

TO THE EDITOR OF THE TIMES.

SIR,—*The Times* is the mirror of public opinion. The more, therefore, does it behove those interested in any matter canvassed in its columns to endeavour that it shall present a faithful and undistorted reflection of the subject brought forward. Now, when a needful reform, after having long been vainly agitated, succeeds at length in fastening hold of the public attention, then a danger always arises lest previous inactivity should be followed by precipitate action, as though the fault of doing nothing were to be atoned by the folly of over doing; and rash and hasty measures are apt to be urged forward, which shoot as far beyond the mark as previous legislation had fallen short of its duties. Then is the time for those practically conversant with the subject to come forward with their experience, and contribute what they may towards the formation of a just and enlarged judgment, lest, peradventure, the forthcoming law, strained too far, should snap in the attempt to apply it, and recoil in augmented mischief.

It is desired to regulate the sale of poisons so as to prevent, as far as the imperfection of human means can prevent, the recurrence of such accidents as have saddened of late the annals of pharmacy; and I venture to say that every respectable member of the trade would rejoice at the advent of a law which would free him from the onerous and harassing responsibility which attends the unwelcome discretion at present vested in him.

But what are these poisons, the indiscriminate sale and use of which are sought to be restrained? Is the law expected to render a definition of what constitutes poison in general, or to give a catalogue *raisonné* of the drugs which are to fall under this legal designation? If the latter were done, our course would be plain and easy; but the problem is how to do it?—for the attempt will throw our legislators back upon the question—What is a poison? With respect to arsenic, laudanum, prussic acid and the like, no doubt can arise. But there is a large class of drugs which might be called semi-poisons—*i. e.*, drugs which have not the reputation of being poisonous, yet which, and in no large doses, would as effectually destroy life as their more notorious congeners—*e. g.*, salt of tartar, liquor of potass, ammonia, &c. Are these to be considered as poisons? Yet the danger of accidents is even greater from them than from their better known, and therefore more dreaded and guarded fellows. Again, there is another class of poisonous chemicals, the deadly nature of which, on the principle that familiarity breeds contempt, is marked to the public apprehension by the fact of their frequent recurrence—such as vitriol and oxalic acid, which are of daily use in the scullery, salts of lemon and of sorrel for removing iron moulds, chloride of lime for bleaching linen, &c., of which there are many establishments that vend annually some thousands of packages. Many deadly chemicals, too, are of regular and customary use in the arts, such as sulphuric and other powerful acids, cyanide of potassium, bichloride of mercury, &c. Others are extensively used for domestic requirements, as the essential oil of almonds, for perfuming pomades, &c. In brief, if all deleterious drugs are to be placed under lock and key, and their sale hedged round with operose and prohibitive formalities, a druggist's shop will become one vast cupboard, and his customers—if any patient enough to undergo the ordeal still remain to him—will be applicants at a *bureau de police.*

The scope of these remarks is this:—If the sale of poisons is to be dealt with by law, then the law must either give a list of the poisons to which it applies, in which case it must be a law for regulating the sale of certain poisons, or it must give a definition of what a poison is, and leave it to the discretion of the retailer to decide what drugs fall under the category. The latter proceeding, I think, both you, Sir, and your readers will pronounce to be unfair, obnoxious, and most inexpedient. The former course, therefore, beset as it is with difficulties, alone remains. Perhaps, however, a list of deadly poisons might be drawn up, which should be the subject of special enactment, leaving the bulk of deleterious drugs to be dealt with in a more general manner.

But to interpose serious difficulties in the way of procuring poisonous drugs which are and which must be generally used, will only open the door to evasions, defeat the very end sought to be attained, and lead to an infinitude of mischievous consequences which would render the last state of the matter worse than the first; for people will not, for the sake of any theoretic notions of perfection, be debarred the enjoyment of things which custom has rendered necessary. A sense of injustice and anger at what would be regarded as an unnecessary interference with their freedom of action would be responded to on the part of the retailer by attempts to redress the wrong. There is an instinctive hatred in the English mind against everything which savours of continental police regulations, and this sentiment, be it right or wrong, must be taken into account in any law which is expected to work well. Englishmen must be legislated for as Englishmen, not as Prussians or Austrians. Let law by all means do what is practicable and practical, but not, by attempting too much, lose all.

On the whole, I am afraid that, with the exception of a few of the deadlier drugs, such as strychnine, prussic acid, and the like, Parliament can do little to relieve us of our responsibilities; neither do I conceive it to be at all necessary for the public interest that we should be relieved of the burden. Certainly no sufficient case has been made out against us. Every pursuit has its percentage of risk and accidents. But, considering that the entire business of the druggist is a successful surmounting of risks, I maintain that the proportions of accidents to the risks incurred is incomparably less in the drug trade than in any other walk of life; and that we are fairly entitled to be considered as emphatically the careful and cautious men of the day.

hemist is subject, like other men, to seasons of lassitude, when neither body
d can act with its customary vigour. Men of other professions scarcely realize
his anxious and arduous position, especially if his trade be of any magnitude,
daily to wend his way through a maze of red-hot ploughshares—a sword of
es ever hovering over his head. Upon the correctness of his every tenth
nds probably the issue of life or death. One fatal blunder, and the chances
he is a ruined man for life, for a trade rarely recovers from the shock inflicted
a misfortune; and such an event may occur through no fault of the principal
n in spite of his utmost vigilance. He is at the mercy, not only of his own
ates, but of the carelessness or wilfulness of a purchaser. The wonder
, not that accidents happen, but that they happen so seldom. After all, no
rd can be devised which will afford protection to the public superior to that
s derived from self-interest, which is the very principle to which in the last
ll penal enactments address themselves; and if a druggist disregards such
and immediate consequences of carelessness, neither would he be made
s by any amount of more uncertain and remote legal penalties.

onclusion, then, at which, upon a review of the whole bearings of the case, I
pelled to arrive is, that the end desired alike by yourself, by your numerous
ndents, and by the public—viz., safety—will be best secured by adhering to
it, though not quite to the letter, of Parson Dale's maxim, "*Quieta quam
movere.*" I have the honour to remain, Sir, your obedient servant,

Sept. 19th. F. E. P.

following observations in an article in the *Atlas* have attracted some
ns:—

s not very wonderful that among twenty-seven millions of people it should
ally happen that some one takes a wrong sort of physic, or too much of a
d right sort, and dies in consequence. Nor will it surprise any one of ordi-
telligence, that occasionally a distressed or needy person should poison him-
occasionally a wicked person poison some one else. But upon these very
grounds a few persons are keeping up a constant clamour for some new law
ound the sale of poisons with all sorts of restrictions. Some propose that
rsons of a considerable amount of education shall be allowed to keep a
t's shop and dispense drugs, while others would be satisfied if it were only
ted to sell the more dangerous ones under a medical order or with grave
ties. In the first place, we deny that the evil is so large as to require any
medy than publicity and the action of public opinion, and in the next place
rt that no regulations likely to be obeyed in this country could permanently
e effect desired. It is, on the whole, a great advantage to the public, and
lly to the poor, that there should be a large supply of Chemists' shops, and
small places the village grocer should sell jalap as well as candles, and Epsom
well as tea. We are notoriously the most physic-swallowing people on the
the earth, and if the open sale of drugs and medicinal preparations were
, the surreptitious sale of them would increase. And considering the prodi-
ats of draughts and the mountains of pills that are daily purchased and
d, we ought rather to rejoice that so many of us keep alive, than be filled
aggerated alarm at an occasional death.

ing to check suicidal mania by keeping away from an entire people the means
destruction, is absurd; and when some poor creature makes his exit with the
a little laudanum, he has probably escaped a more painful and revolting
y some other means. It is by diminishing certain forms of suffering, and
arefully watching symptoms of mental derangement, that suicide must be
ted; and with reference to murder, it is wiser to aim at greater certainty of
n than to rely upon any artificial difficulties we can throw in the way of
ing means of committing that horrible crime. If arsenic and laudanum were
y two popularly-known poisons, and others were not likely to be discovered,
ht easily deal with the matter; but this is far from the case. Recent in-
s have familiarized the public with the fact that strychnine and antimony do
s well; and although the sale of the former might be rendered more difficult,
ld be impossible to prevent persons purchasing at different shops a number of

> safe doses of tartar emetic. It will soon be known that other medicines will destroy life if given in small repeated doses, and if every substance capable of being so used were forbidden to be sold without unusual precautions, it would be such a hindrance to the regular course of trade, that we might be sure the law would be evaded at every turn. Not only is the doctor's shop full of poisons, but that of the oil and colourman also, and pigments of lead, copper, or arsenic would kill as effectually as strychnine itself. Moreover, our ditches grow fool's parsley, the water hemlock is not uncommon, our hedges are ornamented with bryony and woody nightshade, while every garden has its monkshood and laurel. It is physically impossible to make poisons difficult to obtain, and equally so to prevent the diffusion of knowledge as to what are such, and where they are to be found. Indeed, with respect to our common poisonous plants, this is so far from desirable that every one should be taught to discriminate them sufficiently to avoid fatal mistakes.
>
> "If we look to the secondary causes of the celebrated Essex poisonings, we shall see that facility of burying the victims without accurate inquiry into the cause of death, and the general resemblance of the symptoms to those of cholera, offered considerable prospects of safety to the perpetrators of those crimes, which ceased when detection and punishment proved them to be very dangerous methods of seeking gain.
>
> "In the present state of medical education, few doctors are competent to conduct a chemical analysis for the detection of poisons, and in difficult cases it can only be done by those who possess peculiar aptitudes and have made it matter of special study; but we might easily promote a knowledge of chemical science, and where its means fail, or doubtful points arise, Government might advantageously interpose, and defray the expense of further investigation. It is to these scientific and indirect means that we ought to look, and when Parliament meets we hope that if the matter is brought before it, we shall see some exhibition of common sense, and not be favoured with the quack legislation so volubly advocated by the *Times*."

It must be borne in mind that the subject before us essentially divides itself into two parts, namely, criminal and accidental poisoning. No law that human ingenuity can invent would effectually restrain the determined suicide or murderer from his wicked purpose. Disarm the Druggist of the power to furnish the means of destruction, the cutler, the gunsmith, and the ropemaker remain. Canals, rivers, bridges, and open windows afford a means of escape. Sulphate of potash may answer the purpose in the absence of arsenic, and a silk handkerchief is sometimes used in cases of emergency. But there are some persons who, with all the disposition to criminality, are timid and irresolute. They may go so far as to apply to a Chemist for poison, but the formality of signing a book and bringing a witness makes them pause. The Sale of Arsenic Act, although not generally understood and only partially observed, has, without doubt, saved lives by interposing an obstacle to the hasty commission of a crime; and it is probable that the extension of the provisions of that Act to certain other poisons might be attended with a good result. To this extent a check upon criminal poisoning may be practicable, and the reckless or careless vendor of a poison must be responsible for such act.

With reference to accidental poisoning, some responsibility rests on the Legislature, for the same reason that a parent, allowing his child to play with a loaded pistol, would be more or less answerable for the consequences.

The Editor of the *Lancet*, after enumerating a few of the chimerical projects which have been suggested for the prevention of poisoning, both accidental and criminal, makes the following practical remarks:—

> "What is wanted is, obviously, then, some stringent enactment against the indiscriminate sale of poisons. Some security should be taken that the person permitted to sell deadly drugs should both know the dangers attending the use of the substances he is dealing in and feel the responsibility of his trust. In short, he must be an educated and a respectable man. There is no breach of the law of free trade in restricting the sale of poisons to a class; at least, not more than there is

ample precedent for in the case of harmless substances which, were it not for fiscal considerations, might, without impropriety, be sold by any one. People are licensed to sell beer, tea, pepper: the sale of poisons is open to all. Even the druggist, as well as the grocer who sells pepper, is compelled to announce the fact that he is duly qualified to sell that useful condiment by an inscription over his door. Why, then, should not the sale of arsenic, corrosive sublimate, strychnine, prussic acid, be restricted also? If this principle be granted, there is no difficulty in settling who are the proper persons to be licensed. General dealers, hucksters, grocers, are not proper persons. Men who have received an adequate pharmaceutical education, and who are recognized members of the pharmaceutical body, who have a professional and commercial character at stake, are proper persons, and the only proper persons. We heartily wish the Pharmaceutical Society had its powers extended, so as to possess more useful control over the whole body of druggists. In conjunction with the Apothecaries' Society, it might be usefully entrusted with the general supervision and control of the sale of poisons. In such hands there can be no reasonable doubt that the public would have more effectual protection than any mere prohibitory or conditional enactments could provide. We want not a law, not penalties only, but constant watchfulness, skill, and responsibility. These can only be secured by appointing administrative authorities to regulate the mode of sale, to determine who are competent to be entrusted with the fearful charge of dealing in agents capable of working such dire mischief in the hands of the ignorant or the wicked."

Nothing is more futile than the endeavour to fetter the Chemist with impossible regulations and troublesome precautions in the conduct of his business. It has been wisely remarked that, to an intelligent man, who is fit to be trusted with the sale of poisons at all, the consciousness of his responsibility, the dread of a coroner's inquest and its consequences, will be a much more effectual incentive to caution than the fear of a penalty; and with regard to matters of detail, those who have had practical experience are the best judges of the kind of precautions which should be adopted.

We have read with no less astonishment than regret the angular bottle and pot scheme of the Dublin College, the nature of which is placed in its true light by a correspondent in another part of this number. If we had not seen the document in print, we could scarcely have credited its authenticity. We have ordered six copies as an investment, anticipating that in the course of a few years it will fetch a high price as a scarce literary relic.

THE RISING GENERATION OF PHARMACEUTISTS.

A RATHER startling statement in the *Glasgow Herald* of Oct. 6th, on the qualifications of dispensing assistants and apprentices in that city, has reached us through several channels. It is contained in the following passage:—

"From returns which have recently been unobtrusively collected by Captain Smart, our intelligent Superintendent of Police, and which we have had an opportunity of examining, it appears that the drug shops in our city number 124, and that in these are employed 194 assistants. And whatever may be alleged upon a critical emergency as to the extent of the powers of these assistants, every person knows that in their masters' absence they are willing and ready to dispense drugs to those who ask for them. Now, of these 194 assistants, 32 are between the age of 12 and 15, and 60 between their 15th and 20th year; 137 have never attended either a *materia medica* or other class where a knowledge of the principles of their profession might be acquired; 59 do not even know Latin, with which medical practitioners continue to garnish their prescriptions and druggists to label their bottles and pots, and 'beggarly account of empty boxes;' while 34 have had less than three years' practical experience among drugs, and 38 cannot boast of 18 months.

"Ignorance, as well as knowledge, is power; but it is a power of mischief. And when we consider the aggregate sum of ignorance revealed by Captain Smart's returns, and the power for good or evil with which, to a great extent, it is entrusted, our wonder is not that awkward cases do occur, but that they are not much more frequent."

The above statement was noticed in a subsequent number of the *Glasgow Herald* by a correspondent, who subscribes himself a Member of the Pharmaceutical Society by examination in London. He observes, the returns of Mr. Smart give very little insight into the present position of the drug trade, as no distinction is made between the Surgeons, the Herbalists, and the Chemists and Druggists; and all the apprentices, or those who are called such, are included under the name of assistants. He proceeds to state that by far the largest number of the shops are occupied by the Surgeons, Members of the Faculty of Physicians and Surgeons, whose knowledge of drugs is not very extensive or practical, being made subordinate to the practice of medicine; that, not having dispensing business to occupy the time of an assistant, they employ a boy of all work, half apprentice, half errand-boy, who picks up as best he can a little knowledge, and after a year or two may probably be thrust upon the world as an assistant at a hybrid druggist's. He contrasts this mode of proceeding with that adopted by Pharmaceutical Chemists in Glasgow, who joined the Society about the time of the passing of the Pharmacy Act, and who are generally careful in the selection of apprentices, and use all their endeavours to provide them with means of education. For the further promotion of this object, a movement is in progress for shortening the hours of business, and allowing more time for study.

If the statement of Mr. Smart does not give a correct notion of the qualifications of Pharmaceutical Assistants in Glasgow, still less can it be taken to represent the general class of Assistants throughout the country. With those who are on the list of registered Apprentices of the Pharmaceutical Society, one condition is absolute—they have all passed an examination in Latin. All the assistants who are Associates of the Society (with the exception of a very small number who entered the business before 1843, the date of the Charter) have passed the Minor Examination, proving that they have a fair practical knowledge of Chemistry, Pharmacy, Materia Medica, &c. That the number of this class in Glasgow is small is not surprising, since that city, although boasting of commercial pre-eminence and maritime superiority, did not enter the lists with "modern Athens" in the race for intellectual progress in Pharmacy until the eleventh hour, after the passing of the Pharmacy Act, and when the terms and conditions of admission to the Society were more stringent than they had previously been.

The Chemists of Glasgow having been late in the field, it was not to be expected that their Assistants and Apprentices would set them the example,—we usually look for example in the other direction,—but we may hope that the publication of the smart censure, however exaggerated it may be, will produce a good effect; for if the Pharmaceutical Chemists feel annoyed at their Assistants being classed with those of herbalists and others, the remedy is in their own hands. The registers of the Pharmaceutical Society, which are published annually, will serve to correct any statistical inaccuracy in future police returns, and to distinguish those young men who are qualified for their profession from the heterogeneous hybrids who sail blindfold under the colours of their masters' bottles.

The adoption of the privileges of the Pharmacy Act being voluntary, the progress of the improvement which it is introducing must be gradual: it may be slow, but it is sure, as those will find out who lag behind.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

HE COUNCIL OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN
ON THE EDUCATION OF DISPENSERS OF MEDICINE AND THE SALE OF POISONS.

(*Drawn up for general circulation in the public papers.*)

BLIC attention having been directed by numerous editorial articles and rs to the necessity of some legislative enactment for preventing the nsing of medicines and the sale of poisons by incompetent persons, the ncil of the Pharmaceutical Society of Great Britain consider it their duty to a few observations, with a statement of facts, necessary to a clear underling of the subject.

ore than fifteen years have elapsed since the Chemists and Druggists cted a Society for the purpose of introducing an efficient system of education an examination for the future members of their body. Experience had shown the science of the Physician can be of no avail unless seconded by the requisite and knowledge in the dispenser of his prescriptions; that the variable quality ugs, as usually found in the market, occasioned frequent disappointment to cal practitioners and their patients; that the public were exposed to danger the unrestricted sale of strong medicines, including poisons, by uneducated ons; and that the most effectual remedy for the existing defects would be a lative enactment for regulating the qualifications of Pharmaceutical Chemists.

he Pharmaceutical Society was established in 1841, as a means of laying the dation of the desired improvement, through the instrumentality of a volunassociation. The original members or founders of this Society consisted of e Chemists and Druggists in the metropolis and provincial towns, who, ng interested in its objects, volunteered their co-operation; and a Board of miners was appointed to test the qualifications of future candidates for ssion. While it was a fundamental principle of the Society that the passing n examination should *eventually* be an imperative condition of membership, s necessary, in the first instance, to make allowance for the position of the ing race of Chemists and Druggists, to avoid any unjust interference with d interests, and to direct the operations of the Society chiefly to the rovement of the rising generation.

1843, the Society was incorporated by Royal Charter, and a bye-law was d requiring all persons, except those who were in business on their own unt before the date of the charter, to pass an examination prior to admission, fixing a date after which even this exemption should not be granted.

he subjects of examination are Chemistry, Pharmacy, Materia Medica, and my, including the practical manipulations of the laboratory and the dispencounter, the modes of ascertaining the strength and purity of drugs, tests and antidotes for poisons, the doses of ordinary medicines, and an aintance with prescriptions. A School of Pharmacy was founded in Blooms- Square, where lectures on the above subjects are delivered by eminent ssors, a library and a very extensive museum were established, and a ratory was fitted up with all the apparatus required for practical instrucin the processes of the Pharmacopœia and in Chemical Analysis. The Dr. Anthony Todd Thomson, Dr. Pereira, and Professor Fownes gave the school the benefit of their valuable services, assisted by Mr. Redwood, who is the present Professor of Chemistry, Mr. Bentley having succeeded to the chair of Botany and Materia Medica. A considerable number of students have availed themselves of these opportunities of improvement, and their progress has been highly satisfactory.

At the time of the incorporation of the Society, the number of Members amounted to 1662, consisting of the leading Chemists and Druggists in the metropolis, as well as in Liverpool, Manchester, and many other provincial towns. It subsequently obtained a very considerable accession of Members. A branch of the Society is in active operation in Scotland, and a Board of Examiners sits in Edinburgh. Auxiliary Schools of Pharmacy have also been established in Liverpool and Manchester, with a view of preparing young men for the examination.

The expenditure of the Society for purposes of education and scientific improvement, has, from the time of its commencement, exceeded an average of £3000 per annum.

It was the original object of the founders of the Society to provide for the education of the entire body of Chemists and Druggists, and to procure the passing of an Act of Parliament, requiring all future members of the trade to pass the examination. In June, 1851, a Bill in accordance with this object was introduced into Parliament by a Member of the Society, after mature consideration by the Council. This Bill contemplated, first, the registration of all persons at that time in business who should apply to be registered within twelve months; secondly, the recognition of the Board of Examiners of the Pharmaceutical Society; thirdly, the examination of all future members (with the exception above stated) prior to registration; and, fourthly, the prohibition of unregistered persons from carrying on the business of a Chemist and Druggist. If the Bill had been passed in its original form, all the successors of the Chemists and Druggists of that date would have been of necessity regularly educated and examined, and the entire change of the Pharmaceutical body from the condition of a mere trade, without any regular education, to the status of a recognized and qualified profession, would have been effected within the space of from twenty to thirty years.

The Council, supported by the Members of the Society throughout the country, and by the leading members of the medical profession, petitioned Parliament, and appealed to the public for assistance in promoting the passing of the Bill. Plain statements of facts were published, pointing out the danger to which the public were exposed from the incompetence of many of those who dispensed medicines and sold poisons, and drawing attention to the state of the law in all other civilized countries, where the education and examination of Pharmaciens are provided for under stringent regulations. These appeals, and the facts and arguments advanced by the Pharmaceutical Society, produced at the time but little influence on the public mind. The truth of the propositions was not disputed, the propriety of the proposed reformation was admitted, and the medical profession generally expressed favourable opinions, but the subject excited little or no public interest until its importance was demonstrated by a succession of fatal accidents from the sale of poison by unqualified persons, and by the publication of the evidence adduced before the Parliamentary Committee on the adulteration of food and drugs. The attention of the press having now been forcibly directed to the subject, the public appear to have suddenly passed from a state of apathy to the opposite extreme of excitement and alarm. A variety of exaggerated statements have been circulated, and projects more or less chimerical have been proposed by persons not practically acquainted with the facts of the case or with the business with which they desire to interfere. Some of the authors of elaborate theoretical communications in the public papers ignore the fact that the object they have in view has been anticipated by the Pharmaceutical Society, which has already accomplished as much as the powers conferred by Parliament have enabled it to effect, and would have done uch more if the original plan of its founders had been sanctioned by the egislature.

It may be useful to explain the exact state of the law under the provisions of he Pharmacy Act which was passed in 1853, and to show the distinction etween the Act as it is, and the Bill as originally drawn. The Act recognizes he Pharmaceutical Society as a voluntary association for the examination and egistration of Pharmaceutical Chemists, and confers upon the persons so registered the exclusive right to assume or use the title of Pharmaceutical Chemist, harmaceutist, or any other name, title, or sign, implying that they are egistered, or that they are Members of the Society. No person not already egistered can henceforth be admitted to the privilege of registration or membership without previously passing the examination. Consequently, all the pprentices of the present time who aspire to the *status* of a Pharmaceutical hemist, the only one (except that of a medical practitioner) recognized by law s implying a qualification in Pharmacy, must go through a regular course ot tudy to enable them to pass the examination. The Act does not interfere ith the sale of drugs and the dispensing of prescriptions by incompetent persons; but it establishes a distinction between such persons and those who ossess a legal qualification and corresponding title. The influence of the Act must of necessity be gradual. It may partially accomplish in a long series of ears what would have been done much more speedily and effectually by he Bill in the form originally introduced. Instead of directly prohibiting the ispensing of prescriptions and the sale of poisons by unregistered persons, its peration is indirect through the medium of public opinion. It is therefore bvious that the success of such a law must depend greatly on the will of the ublic, since the chief inducement to future Chemists to qualify themselves nder the provisions of the Act is the prospect of distinction as a passport to uccess in business. The Pharmaceutical Society is raising up a qualified class of dispensers of medicine; the law confers on such persons a distinctive title, namely, that of PHARMACEUTICAL CHEMIST or PHARMACEUTIST, but the recognition of this claim to confidence by the public, for whose benefit this law has been passed, is necessary to complete its success.

The indiscriminate and uncontrolled sale of poisons has engaged the serious attention of the Council, and some important statistical information in reference to the sale of arsenic was obtained by the intervention of the Pharmaceutical Society at the time the "Sale of Arsenic Act" was introduced. The assistance of the Society, and the experience of its members, would be available on any future occasion in reference to the sale of other poisons, on which numerous suggestions for legislative interference have been made by persons practically unacquainted with the subject, and the difficulties attending the proposed restrictions.

The Pharmaceutical Society has always taken an active part in exposing and endeavouring to prevent the adulteration of drugs. The subject is constantly under discussion at the meetings of the Society; and in several instances, the publicity thus given to cases of fraud, and impurities prevalent in drugs and pharmaceutical preparations, has led to considerable improvement both in the case of foreign products and those of home manufacture. The Council believe that the exertions of the Society in elevating the scientific character of Pharmaceutical Chemists will have more effect in checking adulteration, imperfections in medicines, and accidents from poison, than any penal enactment that could be passed; and that, however desirable it may be to provide facilities for the summary punishment of persons guilty of fraud, it is equally important, and should be the first object of solicitude to regulate the qualifications of those who dispense medicines, and who ought to be sufficiently educated to be able to test the quality of their drugs and preparations.

The object of the above statement and remarks is to direct attention to the fact that the reformation which recent events have shown to be required, and towards which the force of public opinion is tending, was projected more than fifteen years ago by the Pharmaceutical Society, that great progress has already been made by its voluntary and unassisted agency, and that all that remains to be done may be effected by means of the Society, if armed with more extended powers and assisted by the public.

Signed by order of the Council,
G. W. SMITH, *Secretary and Registrar.*

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES (*continued*).

Elected in September and October.

MEMBERS.

BIRKENHEAD	Scholefield, George	LONDON	Field, James John
BRISTOL	Stroud, John		Gould, John
DURHAM	Wortley, John	RUGBY	Lewis, Thomas C.

MAJOR EXAMINATION.

Bloye, Henry..................Holt

MINOR EXAMINATION.

Banner, Samuel..............Liverpool

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH	TOWNS.
Bourdas, Isaiah	Mr. Bourdas	Pimlico
Brew, John	Mr. Brew	Brighton
Brock, George W.	Mr. Fairbank	Woolwich
Browne, John E.	Mr. Bartlett	Chelsea
Burt, James	Mr. Allanson	Harrogate
Clarke, Caudell	Mr. Searby	Norwich
Cornish, William	Mr. Cornish	Brighton
Draper, Henry F.	Mr. Arnold	Norwich
Hatch, Richard	Mr. James	Bognor
Lawrence, Henry	Mr. Watkins	Stratford
Martin, Henry	Mr. Palk	Southampton
Morley, Edward	Mr. Asling	Spalding
Rea, James P.	Mr. Rea	London
Stokes, Edward H.	Messrs. Lea and Co.	Great Malvern
Thomson, Denzil	Mr. Witherington	Worcester
Trotter, Joseph	Mr. Brown	York
Willsher, Stephen H.	Mr. Bolton	Tenterden

PHARMACEUTICAL MEETING,

Wednesday, October 1st, 1856,

MR. JACOB BELL, PRESIDENT, IN THE CHAIR.

THE following donations to the Library and Museum were announced:—

Journal of the Society of Arts, from the Society.
Journal of the Photographic Society, from the Society.
Systema Materiæ Medicæ, by Dr. Martius, from the Author.
Syllabus Prælectionem, from Dr. Martius.
Denkrede auf J. J. Berzelius, von Dr. Martius, from the Author.
Versuch eines Commentars über die Pflanzen in den Werken von Marcgrav und Piso über Brasilien, von Dr. Martius, from the Author.
Gelehrte Anzeigen, No. 2, 1856, from Dr. Martius.
A specimen of Galls on the Quercus, from Mr. Palmer.
A specimen of Penghawar Jambie, from Mr. R. Howard.
A specimen of pure Glycerine, from Messrs. T. and H. Smith, of Edinburgh.

DISTRIBUTION OF PRIZES.

The Prizes awarded to the successful competitors at the Examinations in the classes of Chemistry and Pharmacy, and Botany and Materia Medica, at the conclusion of the last session, were distributed as follows:—

CHEMISTRY AND PHARMACY.

Examiner, Mr. REDWOOD.

The following were the Questions for Examination:—

What is the *force* represented by the weight of a body as determined by the use of the balance? Is this force common to all matter? If a substance be weighed in an accurate balance, surrounded by air, would the weight indicated be a correct representation of the force above alluded to?

What is meant by the *specific gravity* of a body? A bottle which holds 785 grains of distilled water, holds 797 grains of a liquid (x); what is the specific gravity of x?—A piece of glass weighs 810 grains when weighed in the usual way in air; when immersed in distilled water it weighs 305 grains, and when immersed in a liquid (z) it weighs 315 grains: What is the specific gravity of the glass, and of the liquid z?

Describe the phenomena which have been observed in connexion with what is called the diffusion of gases?

What are the best methods of making spermaceti, castor oil, and balsam of copaiba into emulsions?

Describe the processes for the preparation of oxygen, chlorine, nitrous oxide, and cyanogen gases, and the properties of these bodies.

Describe the composition and modes of production of ether, alcohol, aldehyde, and acetic acid, and explain the supposed constitutions and relationships of these bodies.

PRIZE .... Mr. Henry Booth.
CERTIFICATES OF MERIT .... Mr. Francis Yates.
Mr. Charles Ford.
Mr. Henry B. Bamber.

BOTANY AND MATERIA MEDICA.

Examiner, Mr. BENTLEY.

The following were the Questions for Examination:—

Describe the Primordial Utricle, and mention the chemical composition of it and Cellulose; also show the influence this structure has in the Development of Cells.

Describe the structure of the leaves of Dicotyledonous Plants (both aërial and submerged), and state the distinctive characters between those of Acotyledonous, Monocotyledonous, and Dicotyledonous Plants.

What do you understand by Determinate and Indeterminate Inflorescence? Mention the varieties which belong respectively to each; and describe and give examples of the following kinds: Spike, Spadix, Amentum, Strobile, Raceme, Thyrsus, Capitulum, and Umbel.

What are the officinal substances in the British Pharmacopœias derived from the Natural Order *Menispermaceæ?* Describe their botanical and geographical sources, their physical and chemical characters, and enumerate the officinal preparations of them in the London Pharmacopœia.

Describe the physical characters of Annulated, Striated, and Undulated Ipecacuanhas, their botanical and geographical sources, and the means by which they may be readily distinguished from one another.

What is the botanical and geographical source of Nux Vomica seeds? Describe their appearance and general characters, the source of their active properties, and the means of distinguishing the alkaloid Strychnia from Brucia. State also the doses of Nux Vomica and Strychnia, and of any officinal preparation in which they may be contained.

Give the essential characters of the following Natural Orders: *Linaceæ*, *Aurantiaceæ*, *Umbelliferæ*, *Cucurbitaceæ*, *Dioscoraceæ*, and *Melanthaceæ*.

Distinguish the *Solanaceæ* from the *Scropulariaceæ*, *Gentianacæ*, *Convolvulaceæ*, and *Primulaceæ*.

PRIZE .... Mr. Henry Booth.
Mr. Henry Groves.
CERTIFICATES OF MERIT .... Mr. Francis Yates.
Mr. Charles Ford.

The CHAIRMAN, on presenting the Prizes to Mr. Booth, observed that the circumstance brought to his recollection an event which occurred many years ago, very soon after the Pharmaceutical Society was established. In the years 1841 and 42 he had visited several provincial towns, with a view of explaining the objects of the Society and extending its influence. Among other places he had been (with Mr. Redwood) to Manchester, where a rather numerous meeting of the Chemists and Druggists was held. The objects of the Society were fully discussed, and several of those present argued at some length against the proposal to extend it to that neighbourhood. They said it might be very proper and desirable for the London Chemists to form a society, but it was not fair to tax those in the country to subscribe, as they could derive no benefit from it. Among those who took this view of the subject was Mr. Booth, of Rochdale. The argument was carried on at the meeting at some length, and ultimately Mr. Booth acknowledged himself convinced of the error of his previous opinion. He became shortly afterwards much attached to the Society, brought over many converts to his views, and had continued to be up to the present time one of its most sincere and zealous supporters. It was therefore particularly gratifying to him (Mr. Bell) on the present occasion to have the pleasure of presenting to the son of Mr. Booth two prizes, which had been honourably won, as the result of industry and application in the school of the Society. It had been proved that he (Mr. Henry Booth) possessed good abilities, but no credit was due to him for that. It was a gift for which he ought to be thankful. Credit was due to him for having made good use of the talents which Providence had given him, but he would be no longer entitled to such credit unless he continued to exercise his talents as he had hitherto done. He must not imagine that his labour was over because he had won both the prizes. His success on that occasion was an index of his capacity, and in proportion to the power that he possessed, more would be expected of him. In the profession in which he was about to embark, there was a wide field for scientific research and advancement, and the Pharmaceutical Society had in perspective posts of honour and usefulness to which he might aspire.

Mr. HENRY BOOTH, in acknowledging the honour conferred upon him by the Society, said it would be his earnest desire to act up to the advice which the Chairman had given. He was fully sensible of the force of the observations. He was grateful to the Society for the advantages he had enjoyed, and would persevere in his labours in the pursuit of knowledge.

The CHAIRMAN congratulated the candidates who had received Certificates of Merit. It should be no ground for discouragement that they had not received prizes. Mr. Yates had been complimented by the Professors, who had reported that his merit was sufficient to entitle him to a prize, but unfortunately for him there was another candidate who had surpassed him; and as there was only one prize in each class, the second on the list could only have a certificate of merit. He hoped that all the candidates, whether successful or not in that competition, would persevere in their studies, with a view of qualifying themselves to pass another examination, which awaited all who embark in a profession or business, and in which the examiners were the public at large. The principal advantage to be derived from competing for prizes, was the stimulus to industry and the knowledge thus acquired, which would be found useful in after-life.

A SUCCINCT DESCRIPTION OF A COLLECTION OF AMERICAN DRUGS PRESENTED TO THE MUSEUM OF THE PHARMACEUTICAL SOCIETY.

BY MR. W. PROCTER, JUN., OF PHILADELPHIA.

(1.) *Hydrastis Canadensis.*—The root.—Vulgar names: Yellow root, *Golden seal;* Orange root, *Yellow puccoon, Ground raspberry,* &c. Nat. order, *Ranunculaceæ.* Indigenous to the United States and Canada, but found most abundantly west of the Alleghanies. The plant is figured page 82 Griffith's *Med. Botany.* The root was used by the aborigines as a dye. It is used as a tonic, also as a wash for venereal ulcers, and as an injection in gonorrhœa. It is chiefly employed by the class of practitioners called "Eclectics."* This root was examined by Mr. A. B. Durand (see *Amer. Jour. of Pharmacy*, vol. xxiii., p. 113), who found it to contain *albumen*, *starch*, *fatty matter*, *resin*, *yellow colouring matter*, *sugar*, *lignin*, and *salts*, besides a *peculiar nitrogenous, crystallizable substance*, to which he gave the name *hydrastin*, and which he believes to possess alkaline properties.

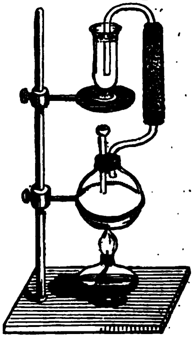
(2.) *Hydrastin.*—A small specimen of this principle, which is used by the Eclectics as a remedy, who consider it as the active principle, having a special action on the mucous membranes, and hence use it in diarrhœa, dysentery, gastritis, &c. &c. I believe the yellow colour is mainly due to adherent yellow resin or colouring matter, just as piperine is coloured by the resin of pepper. By reference to the *American Journal of Pharmacy* as above, Mr. Durand's description of this principle may be found.

(3.) *Sanguinaria Canadensis.*—The rhizoma.—U. S. Pharm. Nat. order, *Papaveraceæ (Blood root, red puccoon root).* See *U. S. Dispensatory.* The *Tincture* (U. S. P.) and the alcoholic extract are much used, and chiefly used by regular practitioners as a stimulating expectorant, but they also possess narcotic and emetic powers.

(4.) *Sanguinarina.*—Of this alkaloid, lately shown by Dr. Sheil, of St. Louis (Silliman's *Journal*, Sept. 1, 1855), to be identical with chelerithrin, one of the alkaloids in *Chelidonium majus*, there is a small specimen. It is not yet used much in medicine, but will eventually, I believe, occupy an important place among the medicinal alkaloids.

(5.) A specimen of *Sulphate of Sanguinarina.*—One of the most beautiful class experiments that I know of is the ocular demonstration of the assumption of a red hue, by sanguinarina, in the act of salification. I am in the habit of exhibiting this by passing dried hydrochloric acid, by means of a capillary tube, into a deep narrow vessel containing a solution of sanguinarina in ether, which is perfectly colourless. As soon as the current of gas reaches the ether, a reddish colouration commences, and soon the whole of the ether is filled with magnificent red flocks of the hydrochlorate of sanguinarina, which is insoluble in ether.

(6.) *Podophyllum peltatum.*—The rhizoma.—U.S. Pharm. (*May apple*, *mandrake*, *wild lemon*, and *raccoon berry.*) This is one of the most valuable and active of our indigenous plants. It owes its activity to a resinous principle, analogous to the *Rhodeoretin* of jalap, which was first isolated by John R. Lewis (See *Amer. Jour. of Pharm.*, vol. ., page). It is quite as powerful as jalap resin. Podophyllum, in the form of hydro-alcoholic extract, is an officinal preparation in the U. S. Pharmacopœia.



(7.) *Podophyllin*, or resin of podophyllum root.—A small specimen, purified and decolorized, made by Mr. E. S. Wayne, of Cincinnati, Ohio.

(8.) *Crude podophyllum resin*, obtained by precipitation from the alcoholic tincture by water. The podophyllin is prepared from this by the action of ether and animal charcoal.

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* The *Eclectic* practitioners of the United States are a sect of medical men who have arisen from the ranks of the botanic doctors, as they are called, and known as Thompsonians. The latter profess to use only vegetable medicines, and especially capsicum and lobelia, and are like the *Coffinites* of England. The Eclectics, however, have comparatively little analogy now with the original stock, but annually become more and more allied to regular practitioners, by the adoption of both regular remedies and practice, but they continue to eschew the mercurials, antimonials, and arsenicals.

It is not identical with jalap resin, however, as by the action of potassa it is not converted into a permanently soluble acid, analogous to rhodeoretinic acid.

(9.) *Eryngium aquaticum.*—Radix.—U. S. Pharm. Nat. ord. *Apiaceæ. Button snake root, water eryngo.* See *U. S. Dispensatory.*

(10.) *Gentiana ochroleuca.*—Radix.—Marsh Gentian. *Gentianaceæ.* Bitter tonic, anthelmintic, and astringent. Found generally in the southern states, and flowers in September and October. (Not much employed.)

(11.) *Caulophyllum thalictroides.*—The root.—*Berberidaceæ. Blue cohosh, squaw root, pappose root.* This root is used chiefly by the Eclectic physicians, who esteem it highly as an emenagogue and antispasmodic, and is said to possess diaphoretic and diuretic powers. A resinous preparation, called "Caulophyllin," is made from it by a process analogous to that for jalap resin.

(12.) *Hydrangea arborescens.*—The root.—*Saxifragraceæ.* Common names, *Leven bark, Wild hydrangea,* &c. See Torrey and Gray's *Flora* and *U. S. Disp.* Used in calculous complaints to a considerable extent in Philadelphia by regular physicians, in decoction and fluid extract. Originally used by the Cherokee Indians, from whom its qualities were learned by Dr. Butler.

(13.) *Dioscorea villosa.*—The root.—*Wild Yam, colic root.* Nat. ord. *Dioscoreaceæ.* The plant is a slender vine, growing in fence corners and hedges, and flowers in June and July. It is considered an antispasmodic, and particularly applicable to bilious cholic, in which complaint it acts almost specifically. The resinoid matter of this root is used by the Eclectics under the name of *Dioscorein.*

(14.) *Trillium pendulum.*—*Beth root, Indian balm, lamb's quarter,* &c. *Triliaceæ.* It is esteemed astringent, tonic, and antiseptic, and is used in hemoptysis, menorrhagia, leucorrhea, &c.

(15.) *Corydalis formosa.*—*Turkey corn, stagger weed, wild Turkey pea.* Nat. order, *Fumariaceæ.* It is considered by the Eclectics to be tonic, diuretic, and alterative. It contains corydalia (see *Amer. Jour. Pharm.*, vol. iii., 3rd series, May, 1855), fumeric acid, and other ingredients, and is hence chemically allied to *Corydalis bulbosa* of Europe. See Liebig's *Organic Chemistry*, vol. ii., Paris edition.

(16.) *Prinos verticillatus.*—U. S. Pharm. *Black alder bark, winter berry Aquifoliaceæ.* Tonic and astringent, and popularly in high esteem as a topical application in gangrenous ulcers; and is used also internally in such cases. Generally used in decoction.

(17.) *Xanthorrhiza apiifolia.*—U. S. Pharm. *Yellow root.* Nat. order, *Ranunculaceæ.* Grows chiefly in the southern and western states. It possesses tonic properties of the quassia character. The yellow colouring matter was used as a dye by the Indians.

(18.) *Cypripedium pubescens.*—The root.—*Yellow ladies' slipper, American valerian, nerve root, yellow mocassin flower,* &c. Nat. ord., *Orchidaceæ.* This root takes the place of *valeriana officinalis* among the "botanic doctors" of the United States, and really possesses very decided antispasmodic and calming powers, and is found highly useful in hysteria and nervous irritability. Other species, as *parviflorum, acaule, spectabile,* &c., are used.

(19.) *Asarum Canadense.*—U. S. Pharm. *Aristolochiaceæ. Wild ginger. Canada snake root.* It contains a pungent aromatic volatile oil and acrid resin. See *U. S. Dispensatory.*

(20.) *Populus tremuloides.*—The bark.—*American aspen.* Nat. order, *Salicaceæ.* Contains salicin, and is a popular remedy for intermittents.

(21.) *Aralia nudicaulis.*—The root.—*False sarsaparilla,* or *small spikenard.* Nat. ord. *Araliaceæ.* Used popularly as an alterative and stimulant diaphoretic in rheumatic affections.

(22.) *Aralia spinosa.*—The bark.—*Angelica tree, prickly ash and prickly elder.* (The name prickly ash also is applied to the *Xanthoxylum fraxineum.*) Used as a stimulant diaphoretic.

(23.) *Panax quinquefolium. Ginseng.*—The root.—U.S. Pharm. Ginseng is now chiefly gathered in the western states. It is but little prescribed or used by physicians.

(24.) *Apocynum androsæmifolium, Dogsbane, Bitter root, &c.* Nat. ord. *Apocynaceæ.* U.S. Pharm.—This root is emetic and tonic. Not much employed by physicians.

(25.) *Apocynum Cannabinum, Indian hemp.* Nat. ord. *Apocynaceæ.* U.S. Pharm.—Emetic, cathartic, diuretic, and diaphoretic. The common name (Indian hemp) is applied to another American plant, *Antirrhinum liviare*, as well as to the Gunjah of India. See *U.S. Disp.* for an account of these roots.

(26.) *Asclepias incarnata, Flesh-coloured Asclepias.* Nat. ord. *Asclepiadaceæ.* Also called *Swamp silk-weed.* U.S. Pharm.—Used as an anthelmintic by Eclectics, and in asthma and rheumatism. It is little used among the profession.

(27.) *Xanthoxylum fraxineum, Prickly Ash, Tooth-ache bush.* Nat. ord., *Xanthoxylaceæ.* U. S. Pharm.—See *U. S. Disp.*

(28.) *Xanthoxylum Clava Herculis?*—The bark labelled with this name I believe to be derived from the *Xanthoxylum Clava Herculis*, from its distinctly marked corky spine bases, and its greater pungency than the *X. fraxineum.* Dr. Wood inclines to believe it derived from the latter plant more developed by a warmer climate. Dr. Griffith, without reference to the two barks, speaks (*Med. Botany*, page 197) of *X. Carolinearium* as identical in properties with *X. fraxineum*, but is more powerfully acrid. The bark may therefore be the product of the *X. Carolinearium.*

(29.) *Gillenia trifoliata.*—Radix.—*Gillenia.* U. S. Pharm.—*Indian physic, American Ipecacuanha, &c.*

(30.) *Gillenia stipulaceæ*, Bowman's root, Western Indian physic.—These plants belong to the nat. order *Rosaceæ,* and possess very decided medicinal value, which would be better appreciated in the absence of the Brazilian Ipecac. For a notice of its chemical constitution, see *Amer. Journ. of Pharm.*, May, 1856.

(31.) *Iris versicolor.*—Radix (vel Rhizoma).—*Blue flag.* Nat. ord., *Iridaceæ,* U.S. Pharm. This root is not much employed in regular practice, but is highly esteemed by the Eclectics, who use it in lieu of the mercurials, and attribute to it alterative, cathartic, sialagogue, vermifuge, and diuretic properties. An *oleo-resinous* extract prepared from this root is known among the Eclectics as *iridin.*

(32.) *Liatris spicata.*—Root.—*Button snake root, Rattlesnake's master.* Nat. ord., *Asteraceæ.*—Diuretic, with tonic, stimulant, and emenagogue properties. For snake bites it is applied externally, bruised, and its decoction drunk freely.

(33.) *Collinsonia Canadensis, Horse balm, Heal-all, Rich weed,* &c. Nat. ord., *Lamiaceæ.* Root (and herbaceous portion also) used.—It is tonic, astringent, and when fresh, will cause gastric irritation and sometimes vomiting. It also possesses diuretic properties.

(34.) *Baptisia tinctoria, Wild Indigo.* Nat. ord., *Fabaceæ.*—The bark of the root most used. It is much esteemed by some practitioners for its antiseptic powers as a gargle and wash in gangrenous ulceration of the mouth and throat, mercurial ulceration, and as a poultice applied to malignant ulcers tending to gangrene. The Eclectics use it in scarlatina and typhus fevers.

(35.) *Stillingia sylvatica, Queen's-root, Queen's delight.*—U. S. Pharm. Nat. ord. *Euphorbiaceæ.*—Emetic, cathartic, and alterative. See *U. S. Disp.*

(36.) *Leptandra virginica.*—The root.—*Culver's physic, Tall speedwell.* Nat. order *Scrophulariaceæ.*—This root was formerly recognized in the U. S. Pharm., but has been omitted. It is highly esteemed by the Eclectics, who consider it as having a direct action on the liver, and use it in lieu of the mercurials. The resino-extractive matter of this root, reduced to powder, is the so-called "Leptandria" of the Eclectics, so much praised by them in functional derangement of the liver.

(37.) *Geranium maculatum.*—The root.—U. S. Pharm. *Crane's bill. Crow-*

foot. Geraniaceæ. This is one of the best and most powerful pure astringents indigenous to the U. States, and contains much tannin. The powder is used successfully as an application in epistaxis, bleeding after extraction of teeth, and the decoction in sore mouth, leucorrhæa, mennorhagia, &c. See *U. S. Disp.*

(38.) *Helonias dioica.*—The root.—*False Unicorn Root, Devil's bit.* Nat. ord. *Melanthaceæ.*—Tonic and diuretic, and applicable in uterine diseases as a special tonic.

(39.) *Juglans cinerea. Inner bark of the root, White walnut, Butter nut.* Nat. ord. *Juglandaceæ.* U. S. Pharm.—A mild cathartic.

(40.) *Jeffersonia diphylla, Twin-leaf Rheumatism Root.* Nat. ord. *Berberidaceæ.*—Used by the Eclectics. See an analysis of this root by Edward S. Wayne, *American Journal of Pharmacy*, vol. xxvii., page 1. It is a diuretic, alterative, and stimulating diaphoretic, used in rheumatism, syphilis, &c.

(41.) *Asclepias tuberosa.*—The Root.—*Butterfly weed, Pleurisy root.* Nat. ord. *Asclepiadaceæ.* Diaphoretic and expectorant. See *U.S. Disp.*

(42). *Myrica cerifera.*—Bark of the root.—*Bayberry, Waxberry.* Nat. ord. *Myricaceæ.*—This bark is very extensively used by the class of irregular practitioners called Thompsonians (Coffinites in England), who esteem it very highly as a stimulant astringent, and enters largely into that noted preparation called "Composition powder" by Thompson, the author of that sect of irregulars, and which is composed of bayberry and capsicum chiefly. Bayberry is used in diarrhœa and dysentery as a stimulant astringent.

(43.) *Myrtle Wax.*—The ceriferous deposit on the exterior of the berries of *Myrica cerifera.* A peck of berries yield Hj ar. of the wax by boiling in water and skimming off the wax as it rises.

(44.) *Euphorbia corollata.*—The Root.—U.S. Pharm. *Large Flowering Spurge.*—Bark of the root used by the Eclectics also. It is emetic, diaphoretic, and expectorant.

(45.) *Euphorbia Ipecacuanha.*—The Root.—U. S. Pharm. *Ipecacuanha Spurge*, wild Ipecacuanha, &c., properties as the above. Both belong to Nat. ord. *Euphorbiaceæ.*

(46.) *Ptelea trifoliata, Shrubby trefoil, Wafer ash, Wing seed.*—Bark of the root.—Nat. ord. *Xanthoxylaceæ.* An Eclectic remedy; belongs to the stimulant tonics.

(47.) *Ptelein.*—The oleo-resin of the root bark of Ptelea trifoliata, an Eclectic "active principle."

(48.) *Polemonium reptans.*—The Root.—Called by Eclectics' works, *American Greek-valerian, Jacob's Ladder, Bluebell, &c.* Nat. ord. *Polemoniaceæ.* It is reputed alterative, diuretic, and astringent.

(49.) *Sabbatia angularis, American Centaury.*—The Herb.—Nat. ord. *Gentianaceæ.* An excellent simple tonic bitter.

(50.) *Gaultheria procumbens, Partridge berry, Tea berry, Winter green.* Nat. ord. *Ericaceæ.*—U. S. Pharm. This is a stimulant aromatic, in domestic practice chiefly. Used pharmaceutically mainly in the preparation of the oil. In the pine region of New Jersey it occurs very abundantly, and is there collected for distillation by persons engaged in furnishing sassafras and other volatile oils.

(51.) *Betula lenta.*—The *Bark.*—*Black birch, cherry birch, sweet birch.* This bark yields by distillation a volatile identical with that of the *Gaultheria procumbens* (see essay by W. Procter, jun., *Amer. Jour. Pharm.*, vol. xv., page 243), which, however, does not pre-exist, but is the result of a reaction between a peculiar neutral principle, *Gaultheria*, and a synoptase-like principle associated with it. The odour of the oil is not quite so agreeable as that of the *Gaultheria*, which is caused by other volatile matter passing over from the bark most probably.

(52.) *Cornus Florida.*—Bark.—*Dogwood.* Nat. ord. *Cornaceæ.* U.S. Pharm. *Tonic, astringent, and antiperiodic.* Much used in domestic country practice in intermittent fevers. The substance announced as *Cornine*, many years ago, by G. W. Carpenter, is now believed not to exist.

(53.) *Eupatorium perfoliatum.* U.S. Pharm. *Thoroughwort, Boneset.* Nat. ord. *Compositæ, Eupatoriaceæ.* Tonic and diaphoretic. The infusion taken cold as a tonic, and drunk warm as a diaphoretic, or, when strong, as an accompaniment to emetics. Much approved by physicians.

(54.) *Convallaria multiflora, Giant Solomon's Seal. Liliaceæ.* Seldom used except in domestic practice, except by the Eclectics.

(55.) *Prunus Virginiana—Cortex.* U.S. Pharm.—*Wild cherry bark.* This is the product of *Cerassus Serotina.* The old name, "*Prunus Virginiana,*" is retained as its medical cognomen, to avoid change, as it is universally known by that name. This bark, which contains amygdalin and an emulsin-like body, gives rise to prussic acid by maceration in cold water, like bitter almonds. It is *very extensively* employed by physicians as a tonic and sedative, and with just cause, as it really possesses valuable powers. See *U.S. Disp.*

(56.) *Chenopodium Anthelminticum, Wormseed, Jerusalem Oak.* — The fruit.—U.S. Pharm. Nat. ord. *Chenopodiaceæ.* This seed is used in the United States to the exclusion of the *Semen Contra*, a European wormseed, *Artemisia Santonicæ.* The oil is largely used as an anthelmintic in regular practice, and as an ingredient in nostrums for vermifugal purposes.

(57.) *Oleum Chenopodii.* U.S. Pharm. Distilled from the preceding. See *U.S. Dispensatory* and *American Jour. Pharm.*, vol. , page .

(58.) *Cimicifuga racemosa.* U.S. Pharm. *Black Snake Root, Black Cohosh.* Nat. ord. *Ranunculaceæ.* Much esteemed by regular physicians, and used in acute rheumatism, chorea, epilepsy, &c. &c. A resinoid extract, obtained by precipitation from the concentrated tincture by water, is used by the Eclectics under the name of *Macroytin*, from "*Macroytis,*" Eaton's generic name for the genus *Cimicifuga.*

(59.) *Racemosin.* A small specimen of this principle is sent; it is new. Mr. Edward S. Wayne, of Cincinnati, who isolated it, has not yet communicated his paper relative to it; it is not presumed to be the *active* principle, however. It is produced from the *Cimicifuga racemosa.*

(60.) *Diospyros Virginiana.*—Dried unripe fruit.—U.S. Pharm. *Persimmon.* Nat. ord., *Ebenaceæ.* The unripe fruit contains much tannic acid, and also sugar and molic acid. As the fruit ripens, the tannin disappears, and sugar takes its place. The ripe fruit, after frost, is highly esteemed by many for eating.

(61.) *Enonymus atropurpureus.*—*Wahoo, spindle tree, Indian arrow word.* Nat. ord. *Celastraceæ.* Used as a diuretic and cathartic in dropsy. Not much used.

(62.) *Gelseminum sempervirens.*—The root.—*Yellow Jasmin* of the southern states. Nat. ord. *Apocynaceæ.* For an account of this plant, with figure, see *Amer. Jour. Pharm.*, vol. xxvii., May, 1855. It is said to possess remarkable properties.

(63.) *Medulla Sassafras.*—U.S. Pharm. *Pith of sassafras.* This is used as a gummy demulcent, like quince seed, for its mucilage, as an application to inflamed eyes. It takes the place of quince seed in the United States.

(64.) *Oleum Sassafras.*—U.S. Pharm. From *Sassafras officinale.* This is sent, not for its rarity, but as being genuine. It is about two and a half years old, and much more coloured than when recent. I procured it from the distiller, and it was then nearly colourless.

(65.) *Monarda Camphor.*—A stearopten from Ol. *Monardæ punctatæ.* See *Amer. Jour. Pharm.*, vol. xvii. p. 86, by W. Procter; and vol. xxv., p. 200, by C. J. Bonsall. The specimen is small, but is sent for its purity and good crystallized condition.

(66.) *White Flax Seed.*—See *American Journal of Pharmacy*, vol. xxvi., page 483, Nov. 1854, for a notice of this new variety and its origin.

(67.) *Sassy Bark.*—From *Erythrophlæum* (*judiciale?*) of Cape Palmas, Liberia, Western Africa. This is the bark used by the aborigines to poison *witches*, (!) &c. See *Pharm. Journ.*, xi. p. 271.

(68.) Fruit and stem of *Erythrophlæum judiciale* dried.

(69.) Flowers and leaves of *Erythrophlæum judiciale*, from Cape Palmas, sent by Dr. McGill, at request of W. Procter, jun., and by him described and named in *American Journal of Pharmacy*, where also a figure of the plant is shown. See vol. xxvi., p. 193. (I should like Dr. Hooker to see this specimen, and examine it critically with my paper, a copy of which is sent herewith; so that he may either correct any errors therein made, or corroborate the description, if approved.)

(70.) *Oleum Erigeroni.—Oil of Erigeron*, obtained by distilling the *Erigeron Canadense* with water. See account of it in *Amer. Jour. Pharm.*, vol. xxvi., page 502, and vol. xxvii., page 319. This oil is now getting into use as a remedy in hemorrhagia, in doses of four to six drops four times a day, with excellent effects. The Erigeron itself is used as a diuretic in nephritic diseases.

(71.) *Catawba Wine.*—This is a small specimen of the wine of the Catawba grape (an indigenous American variety), now so largely cultivated in the neighbourhood of Cincinnati. See *Amer. Jour. Pharm.*, Nov., 1855, for an account of its production.

(72.) *Catawba Brandy.*—A small specimen made from the above wine at Cincinnati.

(73.) A small specimen of *Argols* from Catawba wine, from Cincinnati, Ohio.

(74.) Dried specimens of *Aristolochia serpentaria.*

(75.) Dried specimen of *Corydalis formosa* and *bulbs*.

DUROY'S ANÆSTHESIMETER.

Mr. E. Wood, of Brighton, directed the attention of the meeting to the apparatus of M. Duroy, of Paris, for the administration of chloroform. He referred to the difference of opinion expressed by authors as to the importance of employing suitable apparatus for regulating the amount of vapour inhaled in the administration of anæsthetics, and enumerated thirty-seven cases of death, resulting from the inhalation of chloroform, which he found recorded in the *Lancet* and *Medical Gazette* up to the middle of 1855, in the greater number of which cases an inhaler had not been used. It was important that the best means of obviating such accidents should be adopted, and he thought M. Duroy's apparatus gave the operator more control over the anæsthetic agent than any other that he knew of. He was anxious that the instrument should be fairly tried in one of the large hospitals.

The following is a description of the apparatus:—

DESCRIPTION OF THE APPARATUS.

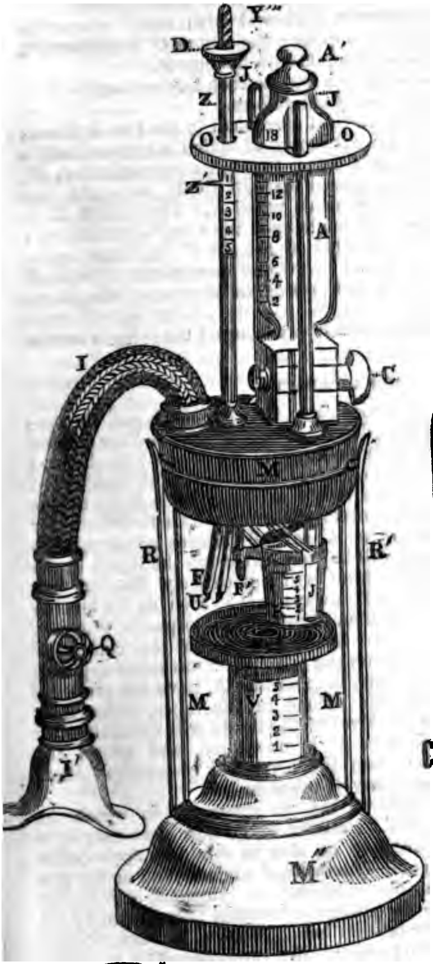
M M (fig. 1.) a glass jar, where chloroform vapour, mixed with air, is generated. *M'*, ebony lid, lined in the interior with cork, hermetically closing the jar. *M''*, ebony foot. *R R*, two elastic metal uprights, rising from the foot of the apparatus, and fitting by means of a protuberance into a moulding on the lid.

A (figs. 1 and 2), reservoir, or kind of displacement vase, bearing divisions each corresponding to 1 gramme (15.4 grains) of chloroform. *A'*, stoppered mouth. *C*, stop-cock, pierced transversely. *A''* (fig. 2), tubulated socket, or inferior extremity of the reservoir.

K (figs. 1, 3, and 4), small graduated vase, into which are introduced—1st, the socket *A''* of the reservoir; 2nd, the shorter branches of the two syphons *FF'*; the interior of which is filled with filaments of cotton.

JJ' (figs. 1 and 7), two tubes, intended for the introduction of air into the apparatus. These tubes rise at the side of the transparent reservoir to protect it, penetrate to the interior of the vase *M*, and nearly touch the tray *U*.

I (fig. 1), flexible breathing-tube, screwed on to the lid and terminated by a mouth-piece *I'*; six centimetres from this mouth-piece are two valves *Q*, whose alternate play permits inhalation and exhalation *out of the apparatus.*



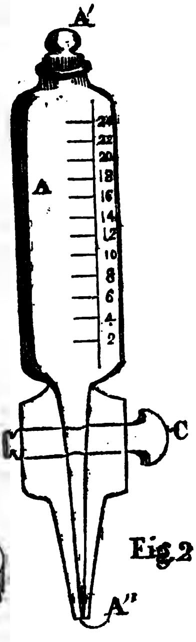


Fig. 2

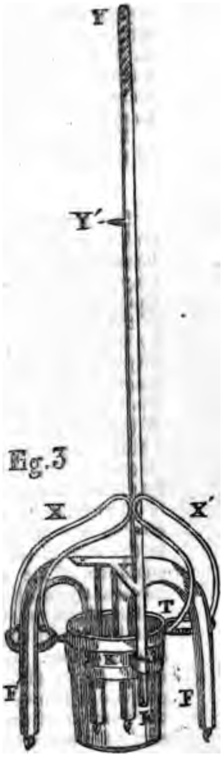


Fig. 3

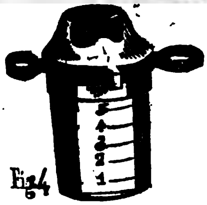


Fig. 4

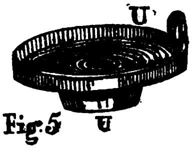


Fig. 5

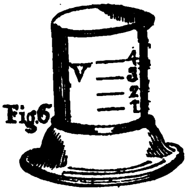


Fig. 6

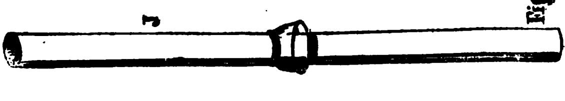


Fig. 7

Maolow.

U (figs. 1 and 5), metal tray, slightly concave, furrowed with small concentric circular grooves, whence arises the chloroform vapour; the centre U' is perforated, so as to permit the flowing of the unevaporated liquid into the cup V.

V (fig. 1 and 6), crystal cup, graduated and on a wooden foot, supporting the tray U, and intended for the reception of the excess of chloroform.

D (fig. 1), regulator, giving horizontal and vertical movement to the two syphons; it is composed of axis YY', fig. 3, the superior extremity of which is screwed into a nut, D', fig. 1. The middle portion of the axis passes through a copper jacket, Z', fig. 1, and its lower extremity, after having passed through the lid, is caught in a copper ring, soldered to the anterior face of the small vessel K. The jacket Z is slit in Z', to allow a small index fixed at a right angle upon the axis, to pass as seen in Y' (fig. 3). The course of the needle is limited by the slit Z'; it stops, consequently at the two extremities numbered 1 and 5. Going downwards, this small scale, 1, 2, 3, 4, 5, engraved on the rim of the slit, *marks the degrees of the Anæsthesimeter.*

XX (fig. 3), two diverging guards, between which are clasped the long branches of the syphons.

MANAGEMENT OF THE APPARATUS.

The Anæsthesimeter being put together according to the plan No. 1, and its *stop-cock C closed*, the liquid is introduced by the orifice A of the reservoir, and the stopper immediately replaced. Now suppose chloroform poured in up to the 16th division (say 16 grammes), and the pressure of the air observed to be exerted thoroughly in the interior of the jar MM', just as in the little vase with the syphons K, by means of the communication which exists between the atmosphere and the air in the interior by the tubes JJ'. *As soon as we open the stop-cock C*, several bubbles of air will be introduced at the bottom by the aperture A'', will be seen traversing the liquid in the reservoir, and an equivalent quantity of chloroform will immediately descend into the little vase K, yet the flow of chloroform will always stop as soon as its level in K touches the extremity A'' of the orifice, for then the simple atmospheric pressure, which is exerted upon the surface of the liquid in K, will sustain the column of chloroform in the superior vessel A. But as on the other hand the small syphons, furnished in the interior with filaments of cotton, dipping into K, have the property of absorbing by capillarity, the chloroform will ascend in the tubes, follow their course, and fall guttatim on the tray U; the level of the liquid will instantly sink in the vase K till the extremity of the channel A'' is uncovered, and allows the entrance of air again into the reservoir; then the level will re-establish itself incessantly, until all the liquid in the great reservoir is exhausted.

The above detailed arrangement constitutes, we see, an apparatus in which the distribution of the chloroform is regular and successive, and takes place only by *a drop at a time.* But, as it was further desirable to be able to obtain an appropriate *estimation* for different ages and the various idiosyncrasies of subjects, and as for that purpose it is necessary that one should be able *at pleasure* to augment or diminish the number of drops, and if possible, also to enlarge or contract proportionally the surface upon which these drops fall (evaporation being relative to surface), the regulator YX (fig. 3) and D (fig. 1) has been added. For understanding the office of this appliance, it will suffice to state that the long branches of the syphons FF are held between two guides XX', fig. 3, and that the bends of the syphons articulate with the arm of the lever T, which is itself attached to the axis Y, fig. 3. Consequently, if the nut D is turned to the left, the axis descends, and the syphons, in obedience to this motion, dip deeper into vase K, at the same time that their long branches, following the oblique direction of the guards, recede from each other. On the contrary, when the nut D is turned to the right, the branches approach each other, because the axis lifts the syphons up.

In the former case the drops of chloroform fall plentifully on the circles farthest from the centre of the tray U, and, becoming evaporated on a greater surface, produce a greater quantity of vapour. In the latter case, the branches being very near one another, and the drops less numerous, falling very near the centre, and having but a small distance to run to reach the orifice of the tray, form but very little vapour.

The different degrees of the instrument indicated by the needle Z', fig. 1, present or evaporation the following number of drops :—

No. 1 gave about 4 drops of chloroform per minute.
No. 2 " 10 " " "
No. 3 " 25 " " "
No. 4 " 40 " " "
No. 5 " 60 " " "

The use of the Anæsthesimeter is subject to the following simple rules :—

1st. Before the experiment, note the weight of chloroform poured into the reservoir.

2nd. Apply a nose-clasp, so that the patient may breathe only by the mouth.

3rd. To begin with, turn the nut D, so as to bring the index Z to No. 1.

4th. *Always starting* from No. 1, let respiration go on for two or three minutes before increasing the drops of chloroform; pass progressively and slowly from a weaker to a stronger degree. In proceeding thus, the idiosyncrasy of the patient is ascertained, and the phases of chloroformisation succeed each other gradually and regularly up to complete anæsthesia, without producing the period of intolerance called *reaction*.

5th. To sustain anæsthesia without danger during long operations, it is sufficient to bring the index to No. 1, and to continue inhalation at *short intervals*.

6th. At the close of the operation the stop-cock is closed, and if it is required to know the quantity of chloroform employed, nothing is more easy. The three vessels, A, R, and V, being transparent, and graduated by grammes, the weight of the chloroform used may be seen by what remains. (Two grammes may be allowed for the liquid retained by the syphon cottons.) Lastly, the chloroform which has fallen into the little cup must be emptied out before commencing a fresh application.

The **Chairman** thought the fatal results which had been referred to by Mr. Wood might be ascribed to peculiarities in the constitutions of the patients more than to differences in the modes of administering the anæsthetic. As he observed an operative surgeon present, that gentleman would probably favour the meeting with his opinion.

Mr. **Alexander Ure** quite agreed with what the Chairman had just stated. He thought there were some points about the apparatus before the meeting which might offer advantages in its use, and he would be very happy to give it a trial at St. Mary's Hospital.

A METHOD FOR THE DETECTION AND QUANTITATIVE ESTIMATION OF QUININE AND OTHER ALKALOIDS WHEN COMBINED WITH FATTY OILS.

BY WILLIAM BASTICK.

Having been required to examine some specimens of cod-liver oil with quinine, with a view to ascertain the presence of that alkaloid and its quantity in them, and there being no published method for the accomplishment of these objects, I have been compelled to devise one. Believing this method to be as simple as it is effectual, not only for the detection and estimation of quinine when dissolved in cod-liver oil, but also for the discovery and separation of other alkaloids when combined with the fatty oils in general, I venture to lay it before the Members of this Society. To render my method more intelligible, I will briefly describe an example of its actual application. Two ounces of the oil supposed to contain quinine were measured off, introduced into a bottle capable of holding four ounces of liquid, and then one ounce of a solution, consisting of sulphate of soda dissolved in distilled water, and slightly acidulated with sulphuric acid, was added. After closing the bottle, the contents were strongly and repeatedly agitated, so as to thoroughly mix the watery and oleaginous liquids. After these liquids had separated again by rest, half an ounce or rather more of the aqueous solution was removed from the bottle by means of a pipette, and passed through a filter, to separate a few small globules of oil still adhering to it. As half an ounce of this filtrate corresponded to one ounce of the oil under examination, care was taken to measure off this quantity correctly for the final operations, which consisted in precipitating the quinine therefrom by means of a solution of caustic soda, slightly washing the precipitate with distilled water, redissolving it in alcohol, and after filtering the alcoholic solution, evaporating it to dryness in a water-bath. The residue was then weighed and examined in the usual manner, to ascertain if it were quinine.

I need scarcely explain that the sulphate of soda in the acid solution is employed to effect the more ready and complete separation of the watery fluid from the oily one, and that the sulphuric acid is added to dissolve out and combine with the quinine which exists in the oil in (if I may use the term) a caustic condition.

From experiments made with cod-liver oil with quinine, prepared by myself of known strength, I feel justified in observing that the method described gives sufficiently accurate results to be relied on for all practical purposes.

In cases where other alkaloids have to be detected and estimated, the process of separation to be employed would be precisely similar to that described for the separation of quinine. When separated, they will of course be recognized by the methods laid down in the text books on chemical analysis.

In conclusion, I may add that the quantity of sulphuric acid employed in this process should be sufficient to render the aqueous fluid slightly acid after it has been well agitated with the oil containing the alkaloid, and that the proportion of the extracting fluid may be varied, in accordance with the convenience of the operator, and the nature and quantity of the alkaloid to be extracted.

Mr. Bastick also drew attention to some Fly Papers which are being sold largely, and which he stated were really very efficient. The manner of using them, was to place them in a plate and moisten them with water, and the flies are found dead in the plate in large quantities. He wished to direct attention to the fact that while they profess to be quite harmless they really are not so, as they were saturated with arsenic, upon which their value depended; he believed they could be easily made by soaking paper in a solution of arsenic and treacle or sugar, and probably a little quassia.

A Gentleman remarked, that he had soaked some of the papers in water, and upon adding ammonia to the liquor an intensely bitter precipitate was thrown down, from which he had concluded that they contained strychnia.

Mr. C. Wood remarked that they certainly contained a bitter principle, which he had understood was chiretta.

ON *PENGHAWAR DJAMBI*, A NEW STYPTIC.

BY DANIEL HANBURY.

A small package of the curious drug, known by the name *Penghawar Djambi* or by the not less barbarous designation *Pakoe Kidang*, was lately offered at one of the public drug sales in the City.

The drug consists of the lower part of the stalk or *stipes* of a large fern, native of the island of Sumatra. The stalks as imported are in straight pieces, about a foot in length and an inch in width. They have mostly been split open lengthwise, perhaps to facilitate their drying. Their most striking feature, however, is the abundant clothing of long, sparkling, golden-brown, moniliform hairs, with which the outer part of the stipes is thickly covered, and which at the first glance suggest for the drug an animal rather than a vegetable origin.

Penghawar Djambi, though new to the English drug-market, has for some years past been in the hands of the pharmaceutists of Holland and Germany, and now has even a place in the Dutch pharmacopœia.*

The plant which affords it, is without doubt, of the genus *Cibotium*. Dr. Ondemans, in his Commentaries on the *Pharmacopoea Neerlandica*,† refers it to

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* *Pharmacopoea Neerlandica*, 1851, p. 58.

† *Aanteekeningen op het Botanische, Zoologische en Pharmacognostische Gedeelte der Pharmacopoea Neerlandica.* Door C. A. J. A. Ondemans, M.D. Rotterdam, 1854, 1. Afl. p. 17.

C. Cumingii Kunze, a fern of the Philippine Islands, regarded by one of our best filicologists as not specifically distinct from the *C. Barometz* of J. Smith. On this point Mr. John Smith has been kind enough to reply to some inquiries I recently addressed to him, in a communication from which I extract the following:—

"I may safely say that the hairy stipes called *Penghawar Jambie* are produced by a species of *Cibotium*. Of this genus, six species are described in Sir W. Hooker's *Species Filicum*,* viz.: *C. glaucescens* Kze. (*Polypodium Barometz* L., *Cibotium Barometz* J. Sm.) and *C. Assamicum* Hook., from the Eastern hemisphere; *C. Schiedei* Schlecht. et Cham. from Mexico; and *C. glaucum* (*Dicksonia glauca*, Smith in Rees's *Cyclop.*), *C. Chamissoi* Kaulf. and *C. Menziesii* Hook., from the Sandwich islands. All are characterised by having the rhizome or caudex and the base of the stipes densely covered with soft moniliform hairs. In the Eastern species, the rhizome is decumbent, and upon removal from the ground, might easily be formed by a little artful manipulation, into the fabulous *Vegetable Lamb* or *Barometz*. The plant which affords this production, was referred by Linnæus from Loureiro's description,† to the genus *Polypodium* and called *P. Barometz*. Nothing further was known of it till about thirty years ago, when the late John Reeves Esq., sent a living plant from China to the nursery of Messrs. Loddiges at Hackney, as the true *Barometz*. This plant increased and in time became an inhabitant of other gardens; it was not, however, till 1840 that it produced fructification, which it did in the Birmingham Botanic Garden, a notice of which is recorded in the *Proceedings of the Linnean Society* for February, 1840. I then identified it as belonging to the genus *Cibotium* of Kaulfuss, and in my *Genera Filicum* published in 1841, I recorded it under the name of *Cibotium Barometz*.

"In the Berlin garden it received the name of *C. glaucophyllum*, afterwards changed to *C. glaucescens* by Kunze, who figured it in Schukhr's *Supplement*, p. 63, t. 31. Since then (1846) dried specimens collected both by Fortune and by Seemann, and corresponding with the living plant, have been received from China.

"Now for the name *Cibotium Cumingii*.—In 1840, Cuming brought specimens of a *Cibotium* from the Philippines, which in my enumeration of the ferns of those islands I named *Cibotium glaucum*,‡ then believing it to be the *Dicksonia glauca* of Dr. J. E. Smith (Rees's *Cyclop.*, vol. xi.). Kunze however considered it a distinct species and named it *C. Cumingii*.

"After much examination of well-authenticated specimens, I have come to the conclusion that *C. Barometz* J. Sm., *C. glaucescens* Kunze, *C. Cumingii* Kunze and *C. Assamicum* Hook., constitute *one* species only. I therefore retain the original historical name of *C. Barometz*, for the eastern type of the genus.

"It appears that the stipes called *Penghawar Djambi* comes from Sumatra. Although I have not seen any fronds of *Cibotium* from that locality, still, judging from the stipes in question, I see no reason to doubt the correctness of referring it to *Cibotium Cumingii*, which as above stated, I regard as not different from *C. Barometz*."

The authors of the *Pharmacopœa Neerlandica* quote *Agnus Scythicus* as synonymous with the Sumatran *Penghawar Djambi*, in which it is evident Mr. John Smith thinks them correct. They do not, however, attempt to fix the botanical origin of the drug, but merely refer it to "Filicis species nondum satis cognita."

Professor Miquel, on the other hand, while referring *Penghawar* to *C. Cumingii* Kunze questions its identity with *Agnus Scythicus* in these words:—"*Agnus Scythicus* seu *Barometz pharm.*, filicis etiam caudex est sed ab eo Cibotiorum diversus."§

Having examined an ancient specimen of the so-called *Scythian Lamb* preserved in the British Museum, ‖ as well as a living plant of *Cibotium Barometz* J. Sm., I must confess I find them far more to resemble each other than they do the Sumatran *Penghawar*. It must, however, be borne in mind that a plant having a range so extensive as to embrace Assam, China, the Philippines and the Islands of the Indian Archipelago, may be expected to vary considerably according to the soil, the situation, and the degree of moisture and heat in which it may grow, so that I am far from impugning the correctness of referring both productions to one and the same plant.

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* Page 82.

† *Flora Cochinchinensis.* Ed. Willd., p. 829.

‡ *Journ. of Bot.*, vol. iii. (1841), p. 413.

§ *Analecta Botanica Indica*, ii., 36.

‖ Probably the same specimen as is excellently figured in Rymsdyk's *Museum Britannicum*, Lond., 1791, fol. Tab. xv., fig. 2.

As I have alluded to the fable of the Scythian Lamb, and it may not be familiar to all readers, I may be allowed briefly to recall it, although to cite one half of the old authors of the sixteenth and seventeenth centuries, who have delighted to tell of its wonders, would be neither an easy nor a very profitable task.

Suffice it, then, to say that *Agnus Scythicus*, *Frutex Tartareus*, or *Vegetable Lamb*, was regarded as a sort of *plant-animal*, resembling in figure a *lamb*, whence its Russian name *barometz*. It was said to spring from a seed like a plant, and to be attached to the earth by a root, while in its animal nature it rejoiced in a sort of flesh and blood, browsed upon the surrounding herbs by turning round upon its axis or root, until, having devoured all within reach, it perished a victim to hunger!

Poetry and Materia Medica are not now-a-days in close alliance, but such was not the case in the beginning of the seventeenth century; and the author who could write an ode on Tacamahaca, Tamarinds, or Cochineal, could have no difficulty in producing a sonnet on so much more poetic a theme as the Scythian Lamb.

Guillaume Saluste, Sieur du Bartas represents the astonishment of our first parents at discovering in the garden of Eden so remarkable a production as a *vegetable lamb*, and then exclaims with pious credulity:—

> "O merveilleux effect de la dextre divine,
> La plante a chair et sang, l'animal a racine,
> La plante comme en rond, de soy mesmes se meust,
> L'animal a des pieds, et si marcher ne peut,
> La plante est sans rameaux, sans fruict et sans fueillage,
> La plante a belles dents, paist son ventre affamé
> Du fourrage voysin, l'animal est semé."[*]

The fable is revived in the following more elegant lines from the pen of a modern author, but they are not very happy as applied to a *Sumatran* plant:—

> "Cradled in snow and fann'd by arctic air
> Shines, gentle Barometz! thy golden hair;
> Rooted in earth each cloven hoof descends,
> And round and round her flexile neck she bends;
> Crops the grey coral moss and hoary thyme,
> Or laps with rosy tongue the melting rime.
> Eyes with mute tenderness her distant dam,
> Or seems to bleat, a *Vegetable Lamb*."[†]

Before dismissing *Penghawar Djambi*, we must however, consider its reputed medicinal and surgical uses. As a styptic, the hair of the stipes may be employed in the same manner as cotton wool, tow, or the nap of a beaver hat. According to Dr. J. M. Van Bemmelen, who has elaborately investigated the chemistry of the drug,[‡] the styptic action of these hairs is solely mechanical. Practitioners, however, have tried the effect of an aqueous decoction of the hairs or of the stem, as a remedy for internal hemorrhage, and some have reported favourably of it.* The experiments of Dr. Van Bemmelen leave little ground for placing any reliance on the reputed good effects of the drug so applied; and I fully concur in that writer's conclusions, as expressed in terms which I translate thus:

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[*] See the French translation of Clusius' Latin version of *Monardes*, by Anthoine Colin Maistre Apoticaire juré de la ville de Lyon. éd. 2. Lyon, 1619. 8vo. where are preserved some other of these effusions, "à la louange de quelques drogues."

[†] *The Botanic Garden*, ed. 3, pt. II., p. 30.

[‡] *Chemische Untersuchung des Penghawar Djambi* in *Vierteljahresschrift für prakt. Pharmacie* V. bd., 3 heft (1856).

"I therefore believe myself justified in the opinion that it is highly improbable that that which water extracts from this plant is an active remedy for internal hemorrhages. There appears to me no ground whatever, either from a chemical or physiological point of view, for presuming that we may expect any good result in practice from the employment of such a preparation."

The **Chairman** said, the business of the Meeting having terminated, he took the opportunity of expressing a hope that the Meetings during the present session would be kept up with spirit, well supplied with scientific papers, and numerously attended. They had made a good commencement, and the valuable addition to the Museum contributed by one of the Honorary Members (Mr. Procter, of Philadelphia) was a favourable indication. It showed that the influence of the Society was not confined to our own country, and by the interchange of information and specimens, whether raw materials or manufactured, with foreign Members, the art and science of Pharmacy would be advanced. The next meeting would be held on the 5th of November.

PHYTOLOGICAL CLUB.

A **Meeting** will be held on Wednesday, Nov. 12th, 1856, at half-past 8 P.M., when a Paper will be read on "The Circulation of Sap," by Mr. Grundy.

PHARMACEUTICAL SOCIETY,

NORTH BRITISH BRANCH.

Dr. Stevenson Macadam, F.R.S.E., will commence his winter course of fifty evening Lectures on Chemistry, on Monday, 10th November, at a quarter past nine P.M., in the rooms of the Pharmaceutical Society, 72, Princes Street, Edinburgh. These lectures will be continued on Mondays and Thursdays during the six winter months.

Fees.—To Members, Associates, and Apprentices of the Pharmaceutical Society, as also Assistants and Apprentices to Pharmaceutical Chemists, £1 5*s.* To gentlemen not connected with Pharmaceutical establishments, £1 11*s.* 6*d.*

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

The Annual Meeting was held in the Royal Institution, on Thursday, September 25th, 1856,

THE PRESIDENT, MR. ABRAHAM, IN THE CHAIR.

The **Secretary**, Mr. **Mercer**, read the following

REPORT.

The Liverpool Chemists' Association has now closed the first seven years of its existence, and your Council, in laying the result of their proceedings during the past session before their fellow members, are glad to be able to report that at no period of the Society's history has it been in a more prosperous condition than at present.

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* Since the above was in type, I have heard from my friend, Dr. J. E. De Vry, of Rotterdam, that the late Dr. Molkenboer, a talented Dutch physician, was firmly of the opinion that a decoction of *Penghawar Djambi* was beneficial in internal hemorrhage.

The Pharmaceutical Meetings have been attended with great success, the supply of lectures and papers having been sufficiently abundant to enable them to hold eighteen meetings, a larger number than has ever been before held in one session since the formation of the Society. From the résumé of the proceedings accompanying this Report, it will be seen that many of the communications have been of a highly important and practical character, and the interest of the meetings has been considerably increased by the large number of specimens, which the liberality of the contributors to the Museum has enabled your Council to lay before the Members. The attendance has on the whole been good, though not equal to what your Council could wish to see, as doubtless the efficiency of this department of the Society's operations, and the interests of the Members themselves, would be materially promoted by a larger and more regular attendance. Sixty volumes have been added to the Library by presentation and purchase since the last anniversary, making the whole number of books belonging to the Society, exclusive of pamphlets, 167; but your Council are not able to report a corresponding increase in their circulation, the number of Members who have availed themselves of its advantages being about the same as in the preceding year. The books chiefly in demand are the standard works of leading authors in the various departments of pharmaceutical science. With a few exceptions the whole of the books are in a good state of preservation, and the bye-laws for the regulation of the Library, agreed to at the last Annual Meeting, have worked well and given general satisfaction; indeed this may be said of all the laws and bye-laws of the Society, for they have now been in operation twelve months, and your Council have no reason to recommend any alterations or additions.

Your Council refer with much satisfaction to the progress made in the establishment of the Museum, upwards of 600 specimens having been presented during the past session, and from the promises of further donations they have received, they feel assured that in a very short period the Society will be in possession of a most valuable collection of the drugs and chemicals used in medicine. The committee appointed to superintend this department, have devoted much time and attention to the consideration of the best means of arranging and preserving the specimens. They have expended most of the remaining funds placed at their disposal, in the purchase of glass jars and shades, and they trust to have in a very few months all the specimens systematically arranged and labelled.

Dr. Edwards reports very favourably of the progress made by the Laboratory Class under his superintendence during the past session. The increased fees paid by the students, and their regular attendance, are proofs of the interest they take in their studies. The successful competitor at the examination of the Laboratory Class, and to whom the President's Annual Prize was awarded, was Mr. William Kitchen, apprentice to Mr. T. D. Walker.

In the early part of the session, your Council received an application from the North End Early Closing Association, on the subject of alleged retail sales by wholesale houses. Your Council thought it hardly came within the scope of their duties to entertain the subject, but having been led to expect that they might with advantage to the Society communicate with the parties, they did so, and have the pleasure of believing that the results were satisfactory to all.

Your Council refer with pleasure to the very liberal offer made to them in April last, by Mr. H. S. Evans, to place at their disposal one of the Society of Arts' Prize Achromatic Microscopes, to be competed for by the Apprentices and Assistants connected with the Association, for the best Essay, accompanied by a selection of mounted specimens, "On the Application of the Microscope to Pharmacy," the judges to be appointed by the Council, and the result of the competition announced at the present Annual Meeting. Your Council obtained the consent of three of the Honorary Members of the Society, Dr. Inman, Dr. Nevins, and Mr. T. C. Archer, to act as adjudicators, and their award will be intimated at the close of the ordinary business this evening.

The retiring Members of Council are Messrs. Sumner, Rawle, Redford, and Abraham, all of whom are eligible for re-election.

The Treasurer's statement exhibits a balance of £7 18s. 6d. in favour of the Society, to be carried over to the next year.

The Liverpool Chemists' Association, in account with R. Sumner, Esq., Treasurer.

SESSION 1855-56.

Dr.	£	s.	d.
To Printing, Stationery, Books, &c.	11	5	8
" Glass for Museum	7	11	0
" Colouring and Lining Museum Cases	3	0	0
" Gas Fittings	2	7	1
" Coffee and Attendance	11	2	10
" Delivering Circulars, &c.	10	5	0
" Sundry small Expenses	1	17	11
" Rent	10	10	0
" Dr. Edwards for Laboratory Fees	34	18	0
" Arrears, 10 Members*	5	0	0
" Balance in hand	7	18	6
	£105	11	0

Cr.	£	s.	d.
By Balance	4	15	0
" Ditto Museum Account	14	15	0
" Arrears, Museum	2	2	0
" Donation to do., F. Langton, Esq.	2	2	0
" Arrears, one Member's	0	10	0
" Library Fines, &c.	1	14	0
" Subscriptions, 84 Members	42	0	0
" " 12 Associates	3	0	0
" Laboratory Fees	34	18	0
	£105	11	0
By Balance for Treasurer	£7	18	6

Examined and found correct,
JOHN H. JOHNSON, } *Auditors.*
GEORGE BARBER, }

It was moved by the PRESIDENT, and seconded by Mr. GUY, "That the Report and Statement of Accounts now read be adopted, printed, and circulated."

Moved by Mr. R. R. JACKSON, and seconded by Mr. WITTHREAD, "That the List of Members, Laws, Bye-laws, and Transactions of the Association, with the Catalogue of Books in the Library, be printed and circulated along with the Report."

Moved by Mr. REDFORD, and seconded by Mr. CUNDILL, "That the thanks of the Association be presented to those gentlemen who have lectured or read papers at the Pharmaceutical Meetings, and also to the Donors to the Library and Museum."

The meeting then proceeded to fill up the vacancies in the Council caused by the retirement in rotation of Messrs. Abraham, Rawle, Redford, and Sumner. Messrs. Abraham, Sumner, Redford, and Kirk were elected.

The Secretary then read the Reports of the Adjudicators, Dr. Inman, Dr. Nevins, and Mr. Archer, on the merits of the Essays and Specimens sent in in competition for the prize Microscope offered by Mr. H. S. Evans.

The Prize was awarded to Mr. R. G. West, and as the Adjudicators considered that the next Essay and Specimens showed considerable merit, the Council had determined to present their author, Mr. W. H. Samuel, with a second prize.

It was moved by Mr. H. S. EVANS, and seconded by Dr. EDWARDS, "That the thanks of the Meeting be given to Dr. Inman, Dr. Nevins, and Mr. T. C. Archer, for examining the Essays and Specimens competing for the Microscope prize, and reporting thereon."

DR. NEVINS acknowledged the compliment on behalf of his colleagues and himself.

Royal Institution, Thursday, 9th October, 1856.

THE PRESIDENT, MR. ABRAHAM, IN THE CHAIR.

Messrs. J. Woodcock, M. Martin, A. Browne, W. Hughes, E. Watts, J. M. Buck, W. Pescod, J. Blyton, T. Welch, L. Pattinson, R. Cordon, J. Shaw, E. Morris, J. Dennant, and J. W. Taylor were elected Members of the Society.

The Secretary announced donations to the Library and Museum from Messrs. G. Hamilton, H. S. Evans, G. D. Banks, R. Clay, Evans, Sons, & Co., and Wanick, Brothers.

This being the first meeting of the session, the President delivered his Opening Address, in which he congratulated the Members on the flourishing state of the Association, the important additions to the museum and library, and the increasing tendency to improvement among Pharmaceutists. He referred to the progress of chemical science during the past year, the detection of vegetable poisons by delicate tests recently introduced, the use of methylated spirit in chemical processes, the metal aluminium and its probable utility in the arts and manufactures, the adulteration of food and drugs, and the efforts of the Pharmaceutical Society to introduce an improved education, with a view of providing a remedy for that and other imperfections. He made some practical observations on the division of labour in the profession, the compilation of the Pharmacopœia, and the decimal system of weights and measures. In the course of his address, he alluded to the measures which had been proposed for preventing accidental and criminal poisoning, and pointed out the difficulty of legislating with reference to that subject, at the same time explaining the indirect influence of improved education in promoting the same object. He concluded by announcing a Soirée about to be held by the Association, and mentioned the microscopic prize as an interesting feature in the proceedings of the evening.

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* Since the auditing of this account the arrears of five members have been paid.

Mr. H. Sugden Evans then presented the microscope prize which he had placed at the disposal of the Society, to the successful competitor, Mr. R. G. West, and in doing so expressed himself highly gratified with the two essays and specimens which had been sent in, in competition for it, and fully concurred in the award of the judges; for although the two sets of specimens were nearly equal, Mr. West's essay was decidedly superior. Mr. Evans expressed his regret that out of eight gentlemen who had started in the race, only two had come in to the winning-post. Nevertheless he hoped that from the remaining six future fruits might be looked for, while to the two successful competitors he hoped the prizes now to be given would simply act as stimulants to increased exertion.

Mr. Evans was pleased to see so many young men present, and hoped that they also would be stimulated to action, and remember that to them we must look for the future elevation of our profession; and he wished to impress upon them the importance of *self-culture*, that they should make use of the spring-time of life, remembering that a blighted spring brings a barren harvest.

It was encouraging to observe that the two successful competitors were the same gentlemen who last session carried off the honours this Society has in its gift, and that they were students in our School of Pharmacy. It is the best guarantee to the public of our being really in earnest in the work of self-education, and it is the best antidote for the blush which must rise to the cheek of each of us on reading the newspaper reports of so many instances of ignorance and culpable neglect amongst a certain class of Chemists and Druggists—not Pharmaceutists.

Mr. West having desired a superior instrument to the Society of Arts' prize microscope, Mr. Evans had added the value of it to one of Smith and Beck's educational microscopes, accompanied with a suitable inscription.

The Rev. Mr. West received the Prize, and thanked the donor on behalf of his son, who was absent from town.

Dr. Edwards moved a vote of thanks to Mr. Evans for the very handsome Prize he had placed at the disposal of the Society.

The President then presented to Mr. W. H. Samuel, one of the laboratory pupils, a small case of microscopical dissecting instruments, which the Council had awarded to him for the care and ability shown in the preparation of his essay and specimens.

The Annual Dinner of the Members and friends of the Society was held at the Neptune Hotel, on the evening of Thursday, 15th October, the President, Mr. Abraham, being in the Chair. About forty gentlemen sat down, and the greatest interest in the prosperity and prospects of the Society was shown by the assembled company, all of whom were highly gratified with the sociable and agreeable termination of the evening.

THE MANCHESTER PHARMACEUTICAL ASSOCIATION,

Which has received a considerable accession of Members during the present year, commenced its fifth annual session on Wednesday, the 8th of October, with a course of Lectures on Chemistry, by D. Stone, Esq., F.C.S., Professor of Chemistry at the Manchester Royal School of Medicine, who delivered his introductory lecture on that day, of which a brief sketch is given below.

Mr. Stone commenced by expressing the pleasure he felt at meeting the students to deliver his fourth course of lectures, and said, that having on previous occasions directed their attention to the study of the principles of Chemistry and the elementary bodies, it was his intention to make some variation in the present course, and show the practical application of the science of Chemistry to their daily occupations. Beginning with chemical manipulation, which might be described as the proper mode of handling a Chemist's tools, he would pass on to the mode of estimating the commercial value of various kinds of chemicals, such as soda ash, chloride of lime, chromates, ammonia, &c., by ascertaining the quantity of available alkali, chlorine, &c., they may respectively contain.

The preparation and properties of the compounds of mercury, sulphur, iodine, iron, &c., used in Pharmacy, will then be described, after which examples of the use of incompatible substances in prescriptions and family recipes will be given, showing how a totally different substance to what the prescriber intended is sometimes produced, and the effect of the medicine destroyed, whilst in other cases a very useful and active medicine is the result.

Poisons, with their tests and antidotes, will then be treated of, and the processes adopted for their detection illustrated. The alcohols and ethers, the tinctures and extracts, will form the subjects of a few lectures; and lastly, the subject of adulterations and the means of detecting them will occupy the remainder of the course.

The lecturer then proceeded to show the connexion of physics with Chemistry, and gave several illustrations of the laws of adhesion, cohesion, capillarity, and gravitation, showing how attention to these laws made many operations in Chemistry easy and certain, whilst ignorance of, or inattention to them, rendered the same operations difficult or impossible.

The first evening meeting of the session will be held in the Royal Institution, on Thursday, November 6th, at 7 o'clock, when the prizes awarded to the students in Botany and Chemistry will be distributed.

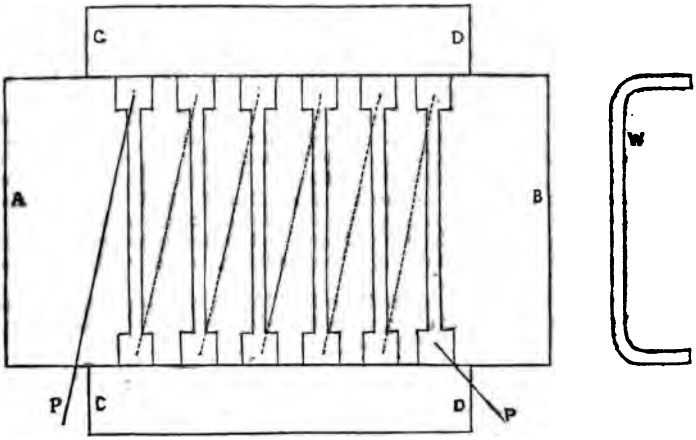
ORIGINAL AND EXTRACTED ARTICLES.

ON THE BEHAVIOUR OF MERCURY IN THERMO-ELECTRIC BATTERIES.

BY W. SYMONS.

In De la Rive's *Electricity*, English edition, 2nd vol., page 549, it is said, "The influence exercised by the molecular structure of bodies over thermo-electric phenomena, follows already, from the fact that one of the conditions essential for the development of thermo-electricity, is that the heated body shall be solid. Thus, M. Matteucci succeeded in demonstrating that the contact of hot mercury with cold mercury produces no thermo-electric current; that, consequently, contrary to the opinion of many philosophers, mercury cannot become thermo-electric." It is true it is said on the following page, "What has led several physicists to think that mercury might give thermo-electric currents, is, that it is a very difficult matter to avoid the contact of the heated mercury with the wires of the galvanometer. But nothing more is necessary, as M. Matteucci has demonstrated, than to plunge two homogeneous, as well as heterogeneous wires into two masses of mercury, which communicate together by means of a syphon, filled with mercury, and of which one is hot and the other cold, in order to obtain a thermo-electric current, which goes from the hot to the cold metal in the wire of the galvanometer." Unless I misunderstand the learned author, he considers the mercury in this case to act merely as a conductor between the two wires, and that it cannot be an efficient element in a thermo-electric battery. As a corroboration that this is his meaning, he does not include mercury in the list of metals given in their thermo-electric order. It has been hitherto the general custom to give in electrical works the metals as arranged by Cumming, and he places mercury very near bismuth.

One great drawback to a rural scientific student is the inability to consult a variety of works in such a case as this, and I have no opportunity of going beyond my own limited library for information as to what has been published of the doings of Cumming and other experimentalists. This of course makes me feel as if I were swimming out of my depth in presuming to question the dictum of so eminent a philosopher, but the experiments with the following apparatus are so simple and I believe decisive, that my only misgivings are whether I have misunderstood the writer. This digression will, I hope, if I am mistaken, be some apology for a young country shopkeeper having the presumption to attempt the correction of a philosopher of a world-wide reputation.



A B is a piece of close-grained wood, 3 or 4 inches long, 2 inches wide, and $\frac{3}{8}$ thick. Across it are cut six or more cells, about $\frac{1}{10}$ inch wide, $\frac{3}{16}$ deep, and $\frac{1}{4}$ to $\frac{3}{8}$ apart. The ends are made wider, as in the plan. *C D* are two trays made of thin zinc and water-tight. The sides towards *A B* must be covered with varnished paper, and fixed accurately to the board, so as to prevent any communication between the cells, which may also be varnished. A sufficient number of iron wires, about No. 16, must be provided, bent as *W*. The ends must be tinned. This can be easily done by filing them clean, and dipping first into a solution of sal ammoniac, and then into melted tin. The tinned ends can then be readily amalgamated with mercury. Fill the cells in *A B* with mercury, and the trays *C D* with cold water. Place the iron wires in the cells as the dotted lines. Warm the water in one of the trays, and connect the battery with the galvanometer by the copper wires *P*. The ends of these must of course be amalgamated. With such a battery of six pairs, a galvanometer with only twelve turns of No. 16 copper wire and astatic needles, deviated 35°; with three pairs, 31°; and with one pair, 24°. With thirteen feet of No. 20 copper wire in the circuit, the galvanometer stood with six pairs 24°; three pairs, 18°; and one pair, 9°. If, according to De la Rive, for "the development of thermo-electricity, the heated body must be solid," and that when mercury is employed, the current depends on the wires making the connexion with the galvanometer, it would certainly follow that the current would be stronger with one pair of the above battery, than with three or six, as there would be less resistance to overcome, and precisely the same sources of electricity in each case. But it will be evident from the above, that mercury behaves as any other metal would, and nearly as energetically as bismuth.

Dunster, 3*rd Oct.*, 1856.

EFFECTS OF THE PRESENCE OF SULPHUR IN COAL GAS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—Permit me to offer a few remarks upon the statements of Dr. Griffin contained in your last number, and having reference to the formation of sulphate of copper by the combustion of coal gas at Bristol. Not that there is anything novel in the discovery of such a fact, because something of the same kind was long ago pointed out by Mr. Faraday in respect to the London gas, when burnt in a much less objectionable atmosphere than that of Dr. Griffin's laboratory. But on three points it appears to me that Dr. Griffin's statements require correction. In the first place, he has found no ammonia in the "green concretions from his boiler," which is very remarkable; in the second place, he asserts that the contamination of the gas with bisulphuret of carbon has "increased since the reduction in the price of the gas," which is not true; and, in the third place, his deduction from the above, that "a cheaper coal has been used" at the gas works, is twin-brother to that which gave it origin—"the wish was father to the thought."

That sulphate of ammonia, or any other salt of that alkali, should act upon copper, need excite no surprise; and as Dr. Griffin is evidently ignorant of the presence of sulphate of ammonia in the condensed products from the combustion of gas, and has even overlooked the existence of this salt in the "green incrustations," I think we are warranted in doubting the correctness both of the analysis and uncharitable theory with which he has amused your readers.

To put this matter, however, beyond the reach of doubt, I lately instituted a set of experiments upon the gas at Bristol, of which the following is a brief description. Having selected a shop or room in which the gas was freely burnt, I suspended from the ceiling a large glass globe filled with ice, which, of course, condensed the moisture and other condensible products from the gas in a manner, to say the least of it, as effectually as Dr. Griffin's boiler. These products, being rapidly precipitated upon the surface of the globe, soon ran down its sides, and dripped from the lowest part into a clean glass vessel placed to receive them. In this way about thirteen fluid ounces of liquid were collected in the course of a few hours; this liquid had a slight odour of aldehyde, was pellucid like water, had no action upon blue litmus paper, was devoid of taste, and was not rendered cloudy by sulphuretted hydrogen or the protochloride of tin, thus proving the absence of sulphurous acid. On being carefully evaporated to dryness by a steam heat, it left only $\frac{3}{10}$ths of a grain (!) of sulphate of ammonia, and an imponderable quantity of a brown residue, resembling what has been called "resin of aldehyde." These were positively the whole of the products from thirteen ounces of liquid, the result of the combustion of at least 200 cubic feet of gas, burnt in the way the public burns it in shops and houses. Any comment of mine upon this fact would be superfluous, and therefore I leave such of your readers as choose to repeat my experiment, to draw their own conclusion with respect to the value of Dr. Griffin's labours.

I have, within the last six years, examined on several occasions the coal and coal gas of the Gas Company at Bristol, both before and "since the reduction in the price of the gas," and can safely declare that they are now precisely as they have hitherto been in respect to impurity, and the gas at Bristol is quite as free from bisulphuret of carbon as the common coal gas of London; nor is it advisable to remove this impurity from coal gas. The peculiar odour which forewarns the public of the escape of gas is due almost wholly to bisulphuret of carbon and certain forms of sulphuretted benzole; when these are removed, as they may be readily enough, the gas becomes devoid of smell, and could not then be regarded as safe and fit for common use. Meanwhile, the books of the Company testify to the identity of the coals used during the last six years, and as the people of Bristol must use some kind of fuel under their copper boilers, I would ask which is the most likely to produce corrosion, the gas which is purified, or the common coals which are not?

I am, &c.,

3, *Parliament St.*, *Sept.* 24*th*, 1856. LEWIS THOMPSON, M.R.C.S., &c.

ON CASEINE CEMENT. By Prof. R. Wagner.

If caseine, precipitated from milk by means of acetic acid, be dissolved in bicarbonate of potash or soda, a fluid is obtained which possesses adhesive properties in a high degree, and was recommended twenty years ago by Braconnot as a cement. The author, by employing various other alkaline solvents for the solution of the washed and pressed caseine, obtained cements which possess valuable properties.

By dissolving caseine in a cold saturated solution of borax, a clear fluid of a thickish consistence is obtained, which is remarkable for its high adhesive power, in which it far exceeds gum-arabic. This fluid gives a slightly shining, varnish-like coating to paper which is covered with it; and the paper thus coated may be employed with much advantage for tickets, which only need to be moistened to make them adhere firmly. It may also take the place of glue in many cases. Experiments in glueing wood with it, gave the most favourable results. The fluid may also be employed in place of albumen in stuff-printing, in the manufacture of artificial meerschaum, to give lustre and consistence to silk fabrics, in the preparation of English plaster, artificial flowers, &c. Woollen and cotton stuffs soaked with the solution and then dried, may be tanned with tannic acid or acetate of alumina, and thus converted into waterproof stuffs. A solution of caseine in soluble glass is to be recommended as a cement for porcelain and glass. Mixed with calcined magnesia, this fluid might perhaps be suited for the preparation of artificial meerschaum.—*Polytechn. Centralbl.*,1856, p. 958.—*Chemical Gazette*, Oct. 15, 1856.

POISONING BY SULPHURIC ACID.

The greatest excitement has prevailed at Runcorn, a small port above Liverpool, during the past few days, owing to the mysterious proceedings attending the death and burial of a female child aged nine days, daughter of Elizabeth and Thomas Brennan, a pedlar, living in Nelson Street, Runcorn. The child was in good health on the afternoon of the 1st inst., was taken ill, and died that night. The day after its death, the parents and a young man named Patrick Frain, who lodged with them, bought an old soap box, with the ostensible purpose of making a rabbit box. The same night the father went to the sexton, told him that his daughter had died, and requested permission to bury it without any "fuss." The sexton consented on the man promising to bring the registrar's certificate the next morning. The child was buried in the old soap-box that night, and the father, having by subterfuge obtained the registrar's certificate, gave it to the sexton. The suspicious circumstances came to the ears of the chief constable, the body was exhumed by order of the coroner, and the appearance of the mouth, throat, and stomach suggesting the suspicion that death had been caused by sulphuric acid or some other deadly poison, the suspected persons were taken into custody. An inquest was held, which, after adjournment, terminated on Monday. Elizabeth Reece stated that she nursed the child up to the 30th ult., returning it to its mother in perfect health. On the afternoon of that day, having occasion to go into Brennan's house, she saw the child struggling and kicking on its mother's knee, blowing from its mouth, and apparently scarcely able to breathe. Hearing on the following day that the child was dead, she went to inquire, but the mother said the child was asleep. The mother locked the door of the room in which the child was said to be sleeping, and, giving the key to a boy, went out with her husband and Frain. In their absence the boy unlocked the door, and witness went into the room and found the child dead, and naked, with a window-blind thrown across it, and a cloth over its mouth and chin. Dr. Edwards, of Birkenhead, Professor of Chemistry, deposed that he had examined the stomach, intestines, and soft organs. The œsophagus and upper portions of the stomach were deeply furrowed by the action of a corrosive liquid, which had destroyed the mucous membrane, and entirely dissolved a portion of the stomach. The smaller blood vessels were blackened and charred, and in the large intestines black patches occurred, which, when placed on test paper, gave strongly acid reaction. He analyzed the contents of the stomach, and detected the presence of sulphuric acid, which was consistent only with the administration of the concentrated sulphuric acid known as oil of vitriol. Mr. H. Wilson, surgeon, Runcorn, had made a *post-mortem* examination, and was satisfied that death had been caused by the administration of sulphuric acid. From the extensive destruction of the stomach, he imagined that as much as forty drops had been given. The jury returned a verdict of "Wilful murder" against the three prisoners, who were committed for trial.—*Times*, Oct. 16.

ANGULAR BOTTLES AND POTS ORDERED IN THE SUPPLEMENT TO THE PHARMACOPŒIA OF THE KING'S AND QUEEN'S COLLEGE OF PHYSICIANS, DUBLIN.

ORDERED,

1. That angular bottles or vessels, and none others, be employed in the dispensing of all medicines intended for external use.

2. That round bottles or vessels, and none others, be employed in the dispensing of all medicines intended for internal use.

3. That all the articles of the Materia Medica and Preparations included in the list which is hereto appended, be kept in shops and warehouses in angular bottles or vessels; and also that the same shaped bottles and vessels be employed in the case of such medicines and preparations being sold or delivered.

4. That all the articles of the Materia Medica and Preparations not included in the list appended, be kept in shops or warehouses in round bottles or vessels; and also that the same form of bottle or vessel be employed in the case of their being sold or delivered.

5. That a similar rule be observed with reference to other medicines, which, though not in the list of this Pharmacopœia, may be kept by apothecaries or druggists, namely, that those possessed of dangerous qualities should be invariably kept and sold or delivered in angular bottles or vessels.

ON THE SUPPLEMENT TO THE DUBLIN PHARMACOPŒIA.

BY MR. JOHN GRATTAN, LIC. APOTH. HALL, DUBLIN.

If your attention has not already been directed to the Supplement of the Dublin Pharmacopœia, issued within the last four weeks by the King's and Queen's College of Physicians in Ireland, perhaps you will permit me to do so; for, though the authority of the Dublin College does not extend beyond its own section of the kingdom, the views to which it lends its official sanction, the powers to which it lays claim, and the orders which, in consequence, it imperatively propounds for the guidance of the Apothecaries of Ireland, are of more than provincial importance, especially at a moment like the present, when steam communication, by effacing all local and sectional distinctions, has rendered the amalgamation of our various Pharmacopœias an imperial necessity.

Every person interested in the advancement of Pharmacy, and anxious to see its grave responsibilities reduced to the smallest practicable amount, will sympathize with the College in its laudable desire to contrive some remedy for "the serious consequences which occur in the dispensing and compounding of prescriptions from the accidental substitution of a dangerous medicine for one possessing less activity," and cordially assent to the adoption of any rational plan, calculated to further such an object.

Passing therefore the question touching the legal power of the College to enforce the remedy which it has devised, the first point will be to examine into the feasibility of the remedy itself, which at all events possesses the recommendation of conciseness.

Section 1 orders "That angular bottles or vessels, and none others, be employed in the dispensing of all medicines intended for external use." Can anything be more perplexing than the impenetrable vagueness of this definition? and it is the very keystone of the whole fabric. What does the College mean by "angular bottles or vessels? Are the bottles to be triangular, quadrangular, pentangular, hexangular, or octangular? Bottles of all these forms are occasionally to be met with, and if any of them may be employed at pleasure, in what then will lie the *impressive* discriminative distinction which it would appear to be the intention of the College to establish? Again, how is the term "vessel" to be interpreted? Under this section it can only refer to the vessels employed for holding ointments or solid external applications. Into what form of angularity are covered pots, gally-cups, and chip-boxes, in which such preparations are usually dispensed, to be moulded, in obedience to this mandate of the College?

Section 2 orders "That round bottles or vessels, and none others, be employed in the dispensing of all medicines intended for internal use;" thus, by a stroke of the pen, interfering, to an extent of which the College can have no conception, with the existing arrangements of nearly every retail and dispensing establishment subject to its jurisdiction, and of the manufactories that supply them with glass. *Moulded octagonal* phials, of every size from four to forty ounces, being those almost exclusively employed at present, surely nothing short of the most self-evident advantage or indisputable necessity could justify so sweeping an innovation. The remaining sections, 3, 4, and 5, are but an extension and amplification of 1 and 2, enjoining drugs to be retailed under the same conditions laid down for the dispensing of prescriptions, and commanding both dispensers of medicine and dealers in drugs to *keep their stock* upon the same plan; all dangerous articles, of which a list is appended, in "angular bottles or vessels," whatever may be meant thereby; all articles not included in the list, in "round bottles or vessels;" and then follows the list, which, as it embraces 130 articles, is too voluminous to be given *in extenso*. It includes, however, all the mineral acids, acetic acid, verdigris, bluestone, sugar of lead, elixir of vitriol, pearl ashes, salt of tartar, red precipitate, nitrate of silver, nitre, *all ointments*, Dover's powders, paregoric elixir, &c. Does the College seriously entertain the idea that articles such as these, some of which are occasionally largely consumed in the arts, and which again frequently require to be retailed in quantities so small as even pennyworths, could by possibility be sent out under all circumstances, and from every petty drug shop in the country, in "angular bottles or vessels," or be similarly kept in stock?

Even supposing the College to be invested by Act of Parliament with authority to dictate such regulations, an assumption far from being warranted by the clauses quoted in its Supplement—could it derive, even from Parliament itself, the requisite power to enforce compliance with so uselessly vexatious and oppressive an enactment? It is much to be questioned. If, then, such a provision could only be partially and imperfectly carried out, would not the community be exposed to greater danger by misleading it into an imaginary security, rather than by leaving it, as now, to the habitual exercise of its own discrimination.

Upon the whole, it is probable that, in the absence of any better suggestion, it might have been fully as judicious on the part of the College, when it did move in the matter, and not less compatible with its dignity, to have profited by the experience of those more intimately conversant with Pharmacy, and to have lent its countenance to some modification of the plan at present in use in many establishments, *viz.*, that of keeping all dangerous preparations apart from the other medicines, in a division by themselves, and the bottles constantly capped either with leather or some other moveable cover, and by further directing, *what it appears entirely and most unaccountably to have overlooked*, that a *Poison* or *Caution* label, as the case might require, should be affixed conspicuously upon every bottle or package, and also upon their external wrappers, the label, as suggested by the Emperor of the French, to be upon some *prescribed* and prominent color, say red or orange. Such a measure would be simple in operation—could be efficiently carried out in any establishment, whether large or small—would occasion very little disturbance in existing arrangements, and would involve no outlay beyond the trifling cost of a few labels, which, in any case, every shop ought to be supplied with. Some provision for regulating generally the sale of poisonous substances, and requiring of *every dealer* in drugs some educational qualification, would, no doubt, be a most desirable addition; but these are difficult and complicated questions for the consideration of the Legislature, and not requiring to be described here. The object upon the present occasion has simply been to inquire into the utility and practicability of the remedy propounded by the Dublin College of Physicians in its authoritative Supplement; and certainly a more ill-digested crudity could scarcely have emanated from any learned body. It satisfactorily establishes one point, however, and that is the necessity that exists for calling in the assistance of the practical and experienced Pharmaceutist in all matters involving the consideration of Pharmaceutical details; a duty which, upon such an occasion as the present, should, of right, have devolved upon the Apothecaries' Company of Ireland, were it not for its own fatuous and suicidal policy. Armed with ample powers for enforcing every educational improvement requisite for placing the profession of Pharmacy in Ireland upon a sound and scientific foundation, it has, by requiring of its candidates a medical education, unauthorized by its act of incorporation, and totally uncalled for by the requirements of Pharmacy, contrived to forfeit the confidence and respect of its own members—to place itself in hostile antagonism to the Medical Corporations of the kingdom, and is so gradually relaxing its hold upon the rising generation of Apothecaries, by attempting to exact too much, that there is every probability that the career of honour and usefulness originally opened to it must, ere long, become closed in consequence of its own folly, and that the trust confided to it will have eventually to pass into other hands; and all this for the barren and profitless ambition of manufacturing medical diplomas, the worthlessness of which is best attested by the estimation in which they are held by the corporation itself, there being scarcely a member of the board who has not deemed it indispensable to his status as a practitioner to append the M.D. of some College to his qualification from the Hall.

Belfast, Oct. 17, 1856.

TWO CASES OF POISONING—OIL OF BITTER ALMONDS—EXTRACT OF BELLADONNA.

BY MR. HOWARD HOPLEY.

Among the many preposterous fashions of the present day, killing by poison, or attempts at it, appears to hold no unimportant rank; in fact, it would seem probable that this mania may greatly influence the future state of English Pharmacy, by obliging the public to acknowledge the necessity for other rules than those now in force to regulate the conduct of its practitioners.

Would you permit me, through the columns of the *Pharmaceutical Journal*, to suggest to Pharmaceutists the expediency of keeping themselves "well up" in their toxicology at this season.

Though such suggestion may be deemed unnecessary and perhaps impertinent, I have been induced to make it from the fact that within this last month I have been called upon, in the absence of a legally qualified practitioner, to attend upon two cases of poisoning, one attempted, and the other accomplished, act of self-killing, and I frankly avow that I should have had great diffidence in acting, had I not lately re-studied some works on the subject in question. I will briefly relate the leading particulars of each case.

A man of about five-and-forty years, full habit of body, and apparently very healthy, swallowed nearly half an ounce of oil of bitter almonds, about the hour of noon; some little time after, the servant heard a groaning proceeding from his room, and on entering found him lying on the sofa in a state of insensibility; she of course immediately took alarm. On entering the chamber an odour of bitter almonds was almost overpowering. I found him breathing stertorously, pupil contracted, eye sallow, face puffy and flushed, pulse scarcely perceptible. The poison had probably been taken fifteen minutes before, and was circulating through every part of the system. Ammonia was applied immediately, both internally and to the nose, and ice-cold water dashed over the face, and his feet and hands rubbed; for a moment the treatment seemed to produce a reaction, but it was only for a moment, the breathing became gradually less, and was intermittent, and in about an hour from the time I arrived, he was dead. A surgeon came just before death, but the dose was too great for anything to have saved him.

The other case was one of a rather more curious nature. A Frenchman of some five-and-thirty years, dark complexion, thin and muscular, swallowed about the size of a bean of dried extract of belladonna; he had by some means become possessed of an ounce bottle of Menier's preparation. After taking it, he lay himself down with a determination to die, and for some time the poison produced no effect, but in less than an hour the usual symptoms appeared, when his courage failed him, and he made known to those in the house what he had done. When I arrived, he was lying on the ground, the head being supported; he was sensible, but quite powerless; in attempts to articulate, he made it understood that there was no pain, but a fearful sensation of sleep upon him; the pupils were very much dilated, extremities clammy and icy cold, pulse slow and full, the face colourless, with appearance as of great pain and fright. His feet and legs were put into a strong mustard bath, and ten grains of sulphate of zinc given in warm water every minute till he had taken forty grains without effect, then a teaspoonful of mustard administered in a tumbler of water produced violent vomiting, which continued with frequent doses of warm water. A surgeon here arrived with a pump, but he did not think it requisite to insist on using it, as the patient evinced a desperate repugnance to the instrument, and as the continued vomiting had brought about a considerable reaction, he being able to articulate distinctly, and complain of an excruciating pain over the chest, produced no doubt by the emetic. Stimulants were continued to the extremities, the pupils became less dilated, and he slowly recovered from the effects of the poison.

Tichborne Street, October 11*th.*

ATTEMPTED SUICIDE BY LAUDANUM.

THAMES POLICE COURT.

Mrs. Elizabeth Ann Hopkinson, aged twenty, the wife of a Chemist and Druggist at No. 85, Broad Street, Ratcliffe, was charged with attempting self-destruction by swallowing a large quantity of tincture of opium.

Mr. Burch, house-surgeon of the London Hospital, stated that the prisoner was admitted into that institution on Monday, September 22, labouring under the effects of poison, and she was then in such a precarious state that not the least hopes of her recovery were entertained. He applied the stomach-pump and dislodged some poison from her stomach. She had been under medical treatment until Tuesday afternoon, when she left the hospital, and was in a state of great suffering for several days. He asked the prisoner why she attempted to destroy herself, to which she replied that a woman had persuaded her to do so, and that she was very unhappy at home. Mr. Burch wished it to go forth to the public, that owing to the ready facility for obtaining narcotic drugs and other poisons, cases like these had been very numerous. There were now four persons in the hospital under medical treatment who had taken poison, and the hospital authorities were determined that every case of the kind should be investigated before a magistrate.

Mr. Carson, a respectable surgeon, in extensive practice at Cock Hill, Ratcliffe, said he was called upon on Monday week to attend the prisoner, who was labouring under the effects of a powerful narcotic. He was informed she had taken some tincture of opium. She was in a comatose state, and her husband was by her side much distressed. Mrs. Hopkinson obtained the laudanum from him, and he would state how it was. Mr. Hopkinson was his neighbour, and carried on the business of a Chemist and Druggist, and dispensed medicines. He had been in the practice of obliging Mr. Hopkinson with drugs, as he was in the trade. On the 22nd ult. he received a message from Mrs. Hopkinson that she was in want of tincture of opium for customers, and he sent her in a phial properly wrapped up and sealed, one ounce and six drachms of the very best tincture of opium.

Mr. Yardley.—Enough to kill many persons.

Mr. Carson.—There were forty innocent doses. That was calculated to destroy from six to ten lives.

Mr. Yardley.—I suppose the large quantity swallowed by this unhappy woman was sufficient to destroy its effects; in some measure to counteract its agency on the system?

Mr. Carson.—She said she only took a portion of what I sent her, but I don't believe her. It was by the most strenuous efforts her life was saved. I saw her on the evening of the day she took the poison, and asked her how she came to do such an awful thing, to which she replied that she did not know; but on my pressing her to answer me correctly, she said, "It was that old man caused me to do it." I do not know whom she alluded to. On a second occasion she said she took the laudanum to frighten her husband; that she obtained it to supply customers with in small quantities, but being excited, took the whole of it herself.

In answer to a question by Mr. Yardley, the witness said he had seen Mrs. Hopkinson in the shop more frequently than her husband.

The Prisoner, a good-looking, and rather lady-like young woman, but somewhat haggard, said, "I will not do so again; I am very sorry."

Mr. Yardley.—You hear what your friend Mr. Carson says, that you are more frequently in the shop than your husband, and you dispense drugs and don't understand the properties of them.

The Prisoner.—Yes, it is the case. I am there more often than my husband. I serve out medicines.

Mr. Yardley.—You do? It is perfectly shocking.

The Husband, a little, well-dressed man, twenty-six or twenty-seven years of age, who was in a very agitated state, and who could scarcely answer the magistrate's questions, said he had been away from home times and times. He went into the country, as his business lay in the county where his wife came from—Derbyshire; he had a very large business.

Mr. Yardley.—You go into the country and leave your wife, a young woman to whom you have only been married twelve months, to dispense medicines and sell poisons? It is really monstrous.

Police-sergeant Smith, No. 28 K, said Mr. Hopkinson had been almost continually drunk for some time, and was a very hard drinker. He was informed that Mrs. Hopkinson, who had been married twelve months only, and was most respectably connected, had also commenced drinking heavily.

Mr. Hopkinson (stammering).—Oh yes, Sir, I am addicted to drinking.

The Prisoner.—I never sell poisons, Sir.

Mr. Yardley said this case had assumed a most serious aspect. A drunkard, verging on *delirium tremens,* indulging in his own vicious propensities, left his wife to administer deadly drugs, and she took enough herself to destroy ten persons.

Mr. Young, a solicitor.—The mother of the young woman in the dock has come up from Derbyshire to take charge of her daughter, and the husband is going to dispose of his business. Unfortunately he has indulged freely in drink.

Mr. Yardley said he was going to discharge Mrs. Hopkinson on account of the sufferings she had undergone and the repentance she had evinced, but before she left the dock it was his duty to tell her that self-murder was felony, and that an attempt to commit suicide was an indictable offence. She could be prosecuted for a misdemeanour. He would leave her to be told by her friends what her offence was in another point of view, and how deeply she ought to reflect on the folly and wickedness of the rash act she had committed.

The prisoner, who was in a very agitated state, was then set at liberty, and left the court with her friends.—*Times,* Thursday, Oct. 2.

On the 8th of October an inquest was held at the "Vine," Ratcliffe, on the body of the above-named James H. Hopkinson, Chemist and Druggist, aged twenty-nine years. The case excited considerable interest, on account of the recent occurrence. The deceased had been in business as a Chemist and Druggist for about six months only, at 85, Broad Street, next door to the "Vine." He was stated to have commenced with good prospects, having considerable property; he soon commenced drinking to excess. His wife, to whom he had been married about twelve months, was more often attending to the shop dispensing and compounding medicines than her husband. It is supposed that the misery she endured in consequence of his bad habit led to the commission of the attempt on her own life. On the evening of Oct. 1st (after leaving the police-court), Mr. and Mrs. Hopkinson proceeded to the West-end on business, and called at a coffee-house in Charing Cross to take tea. While lifting the cup to his mouth Mr. Hopkinson broke a blood-vessel and brought up a great quantity of blood. He was taken home and had constant medical attendance. After the relief of the urgent symptoms an attack of *delirium tremens* came on. He arranged his worldly affairs, and on Monday, Oct. 6th, he was attacked with bleeding at the nose, under which he sank. The Coroner remarked on the unfortunate circumstances of the case, but observed that the loss of blood was obviously the cause of death; and a verdict was returned to the effect that he died from natural causes.

ATTEMPT TO POISON WITNESSES ON A TRIAL.

An infamous attempt was made on Tuesday, October 14th, to poison or hocuss a number of witnesses who had been subpœnaed to give evidence on a trial this week at the Worcestershire quarter sessions. The parties for trial are Sergeant Marriott and Private Barm, of the 32nd Regiment, and Henry

Tipper, a cabman, who were charged with robbing an old pensioner named Burrow of 14 sovereigns on the 19th of August last. The trial would take place in due course at the quarter sessions this week, and the witnesses were assembled in Worcester on Tuesday for the purpose of giving evidence. Tipper had been admitted to bail, and it appears that attempts had been made previously to prevent justice taking its course. It seems that Tipper got the witnesses together at a beer-house in Worcester on Tuesday, and sent a man named Bury, who was to have been a witness for the defence, to a druggist's shop for 45 grains of opium, which he represented was wanting to poison a horse with. The whole of this appears to have been thrown into a quart of ale, which Tipper proposed to "treat" the witnesses with. Three of the witnesses drank of the ale, but the fourth, on putting it to his lips, was struck with its peculiarly bitter taste, and said something had been put into it. Another of the party, acting promptly upon the suspicion which was thus aroused, ran to the shop of Mr. Tyler, the druggist of whom the opium had been purchased, and who lived close at hand, where he learnt that a man answering the description of Bury had purchased opium as already described, and the party returned to the beer-shop just as Bury was leaving it. He collared him, and, finding the three men who had partaken of the beer were already very ill, he gave him into custody, together with Tipper; and medical assistance being promptly procured, the drugged witnesses were so far recovered at night as to be able to go before the grand jury, who have returned a true bill against Tipper and his companions for the felony. After a lengthened examination, occupying two days, concluded on Monday, October 20th, Bury was committed for trial, and Tipper was discharged for want of evidence.

SUICIDE.

On Thursday, October 16th, an inquest was held at the White Lion Inn, Friday-street, before Mr. Payne, on the body of Albert Tanner Howell, aged 28, a commercial traveller in the house of Messrs. Gillott and Foster, Cannon-street West, who committed suicide by jumping from the fourth story window of the warehouse. It is stated that the deceased was cheerful, and of steady and sober habits. He was about to be married, but, some difference having arisen, the engagement was broken off, which led to a remarkable change in his demeanour. On Tuesday evening he was out with a friend, and they separated about twelve o'clock; the deceased returned to his lodgings, and appears to have laid down on the bed with his clothes and boots on. On the following morning he proceeded to the warehouse in Cannon-street, and went directly to the fourth floor, opened the window, and leaped into the street. In his descent he struck Mr. Reece, a clerk in the house of Messrs. Berens, Blomberg, and Co., causing him serious injury. The deceased was killed on the spot. Verdict, "Temporary insanity." It is suspected that it had been his intention to destroy his life by means of chloroform; a bottle and a sponge were found in his pocket, but the bottle was empty, from which it is inferred that he had failed in the endeavour to procure chloroform.

SUICIDE BY OIL OF BITTER ALMONDS.

An inquest was held at the Golden Lion Inn, Leeds, October 17th, before Mr. Blackburn, on the body of Matthias Waddle, aged 71, who had committed suicide under the following circumstances:—The deceased was a cloth-dresser by trade, and had kept a school; but in consequence of the dissipated conduct of his wife, had been so reduced as to be compelled to apply to the Board of Guardians for relief, who certified him as able-bodied, and ordered him to the test work of sweeping the streets with a certain allowance. This on his return home he complained of, and seemed to think it a degradation. The following morning he went out, returning in a few minutes, when his wife smelt a peculiar odour proceeding from him, and knowing he had some poison about him, she asked him what he had taken. He first denied, but afterwards acknowledged that he had taken poison; he then rushed out of the house, and went to the Olive Branch public-house, complaining that he was ill, and requested them to send for a doctor, but he died before the surgeon arrived. On a *post-mortem* examination it was found that death had been caused by essential oil of almonds. A letter was found upon him, addressed to a Mr. Scholes, requesting him to administer to some property and attend to his affairs. The jury returned a verdict of "Temporary insanity."

POISONING BY SULPHATE OF POTASS.

An inquest was held on Tuesday, Oct. 21, before Mr. W. Baker, Coroner for the Eastern Division of Middlesex, on the body of Elizabeth Gaylor, aged thirty years, who died from the effects of a large quantity of sulphate of potass, purchased by her husband, who was charged with causing her death. It appeared in evidence that the prisoner told Mr. Vinall, the surgeon who made the *post-mortem* examination, that he purchased the sulphate of potass of Mr. Stamford, chemist, Homerton, at the request of his wife, for the purpose of causing miscarriage, but it appears from Mr. Vinall's evidence that deceased was not pregnant.

Mr. Stamford spoke to the sale of the sulphate of potass to the prisoner, stating that he had been in business four years, but never sold it before. The only use to which he knew that it was applied was in making Dover's powders. *Dr. Letheby* analyzed the contents of the stomach, which was found to contain sulphate of potass. Two tea cups, also contained 74 grains, and a packet found under the bed of deceased contained 181 grains of the same salt. *Dr. Letheby* believed, from the capacity of the tea cups, and the quantity of sulphate of potass he had found, that the deceased had taken about an ounce and a half, and from the appearance of the stomach and intestines, was of opinion that the deceased died from the administration of sulphate of potass. After the examination of several other witnesses, the *Coroner* summed up the evidence, and the Jury returned a verdict of "Wilful murder against William Gaylor," and also a verdict of "*Felo-de-se* against Elizabeth Gaylor." The prisoner was then committed to Newgate to take his trial.

BOOKS RECEIVED.

The Principles of Surgery. By James Syme, F.R.S.E., &c. Fourth edition. London: John Murray, 50, Albemarle Street, 1856. (From the Publisher.)

Address to the Graduates of the University of Edinburgh, August, 1856. By James Miller, F.R.S.E., &c.

Introductory Address delivered at the Middlesex Hospital; Medical Session, October 1, 1856. By Campbell de Morgan, F.R.C.S., &c. &c. Printed by request. (From the Author.)

Nouveau Procédé de Dosage de l'Acide Carbonique dans les Eaux Minérales, *suivi de Considérations sur la Constitution des Eaux de Vichy.* Par M. Henri Buignet. Paris: E. Thunot et Cie., 1856.

Supplement to the Pharmacopœia of the King's and Queen's College of Physicians in Ireland, 1850. Dublin: Hodges, Smith, and Co., Grafton Street, 1856.

TO CORRESPONDENTS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

October 7th, 1856.

Sir,—If it be in your power to give me a comparative table of the French weights and measures to the English weights and measures, I will be extremely obliged to you.

I remain, yours,

Pharmacien

TABLES OF FRENCH WEIGHTS AND MEASURES.

Décigramme	0.10	= 1.544	of a grain, or	1½ gr.	nearly
Centigramme	0.01	= 0.154	" "	⅙ gr.	"
Milliagramme	0.001	= 0.015	" "	1/65 gr.	"

Décagramme	= 154.4	grains	= ʒiiss.	nearly
Hectogramme	= 1544.	grains	= ℥iij. ʒij.	"
Kilogramme	= 15540.	grains	= ℥xxxij ʒj.	"
Myriagramme	= 154400.	grains	= xxvij ℔.	"

	Galls.	Pts.	Ozs.	Drs.	M.
Litre	= —	1	15	1	48
Décalitre	= 1	1	12	1	15
Hectolitre	= 22	0	1	4	48
Kilolitre	= 220	0	12	6	24
Myrialitre	= 2200	7	13	4	48

We have received a letter from Wolverhampton, being a reply to a general anathema pronounced against Manufacturing and Pharmaceutical Chemists on the occasion of a recent carousal by the members of a new firm distinguished for self-laudation. The statements referred to are more likely to amuse than deceive, and the extravagance of the slander is too transparent to require any answer.

W. L. (Dundee).—In hospital practice it is customary to contract prescriptions by a kind of conventional short hand, which is understood between the medical officers and the dispenser of the institution. Such prescriptions are not intended for use out of the establishment. The entire omission of directions for taking the medicine is not usual, and throws on the dispenser more than his proper share of responsibility.

P. C. (Bradford).—The title Pharmaceutical Herbalist is not recognized in the Act, but if used as a means of deceiving the public, is an infringement of its provisions.

M. P. S. (Peterboro').—(1.) Amber varnish for photographs is made by dissolving amber in chloroform, about three or four grains to the ounce.—(2.) The specimen of black varnish appears to be asphaltum dissolved in benzole; for the purpose of backing photographic pictures, a small quantity of solution of india-rubber is sometimes added.

Cesarea (London).—Bowman's *Practical Chemistry.*

J. F. (Barrhead).—No.

Scion (Paisley).—The persons alluded to not being Members of the Society, cannot legally use the title of "Pharmaceutical Chemist."

H. J. C. (Oxford).—Chemists are permitted to sell spirit of wine for *medicinal use only.*

X. X. (Lewes).—(1.)—We regret the delay.—(2.) *A Course of Study for Apprentices and Students.* The subject has received attention, as will be seen on referring to vol. xii., page 314 ; vol. xiii., page 149 ; and vol. xv., p. 145.

Delta (Brierly Hill).—Apply by letter to the Secretary, 17, Bloomsbury Square.

Ozone (Haverfordwest).—The road to distinction in chemical science does not necessarily pass through any particular school or college.

Norfolk wishes to know our opinion on clairvoyance and mesmerism. The subject is entirely out of our province.

Ignoramus (Exeter).—*Nepenthe* is a preparation of opium made by Ferris and Co., Bristol. There is no published formula. The word nepenthe is derived from the Greek, νη not, πενθος grief.

M. P. S.—When iodide of iron and simple syrup are ordered in a prescription, a proportionate quantity of *Syrupus Ferri Iodidi* may he used.

R. T. (Liverpool).—(1.) The London Board of Examiners meets usually on the third Tuesday in each month, except May and September.—(2.) No.

A Subscriber (Wolverhampton).—(1.) *Iron Alum*, vol. xiii., page 306.—(2.) *Iodide of Potassium* crystallizes in cubes ; if large crystals are required, the evaporation should be conducted slowly.

Q. (Tamworth).—We are not aware that China clay differs materially from other varieties of white clay.

The observations and statement "On the Education of Dispensers of Medicine and the Sale of Poisons" (page 263) having been prepared by the Council for the general information of the public, copies may be obtained on application to the Secretary.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd) to Mr. Churchill, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XVI.—No. VI.—DECEMBER 1st, 1856.

PHARMACY IN AMERICA.

THE laws which regulate the profession in America, exhibit a striking contrast to those in force on the continent of Europe, and described in some of our late numbers. The voluntary principle is here carried to the greatest possible extent. The disposition of the American people, and the great extent of the country, are alike incompatible with the strict supervision and interference with the liberty of the subject, which constitute the policy of despotic governments.

The progress of a profession from the amorphous state to a recognized and efficient position, must, of necessity, be very slow and gradual, under the voluntary system. The prejudices of individuals must be met or overcome, and ample time must be allowed for the introduction of innovations which, if suddenly attempted, would clash with existing interests, and thus provoke hostility. The establishment of Pharmacy as a profession in America, has, therefore, been a work of many years. It has not been fostered by government patronage, or pushed forward by penal enactments, but the stimulus to which chiefly it owes its permanent existence, is the influence of self-interest, gradually inducing the many to follow the example of the few who originated the undertaking, and introduced a professional qualification as a means of securing public patronage.

Mr. Parrish, of Philadelphia, who has written several interesting papers on the subject, observed in 1854:—

> "It is only recently that we are beginning to find out the great law that regulates our progress: that while in regard to the apparent *necessities* of life, the supply always follows the demand; in regard to its *refinements* and *elegancies*, the reverse is the case; the demand grows up under the stimulus of increasing supply. A retrospect of the last thirty years is full of instruction in this particular. Not long since there were scarcely half-a-dozen sets of Apothecaries' weights in Philadelphia. There were so few shops that could be depended on, that prominent Physicians preferred dispensing their own remedies. Even the best Druggists could scarcely make a respectable show of bottles upon their shelves, from the paucity of materia medica then in use; and the chief reason that made the business lucrative was its association with other branches of trade, and the absence of any great competition. The establishment of Colleges of Pharmacy in Philadelphia, New York, and Baltimore was the first cause of a favourable change. The members of those institutions by association learned to sink party jealousies in a united effort for the common good: they set about self-improvement, and commenced to teach their apprentices how to become better chemists and pharmaceutists than themselves. They called forth a spirit of activity in the field of experiment and observation, and as a result, a home pharmaceutical literature sprung up, a National Pharmacopœia was adopted, the U. S. Dispensatory and Ellis's Formulary were issued from the College of Pharmacy Faculty, a general improvement began to manifest itself in every department of the business, and brought a corresponding increase of public patronage."

The progress of the undertaking in the first instance was very slow. Having for more than twenty years been in correspondence with some of its most active promoters in Philadelphia, we are enabled to form some idea of the difficulties with which they had to contend—the numerous appeals to their brethren for co-operation—the indifference of some—the impracticability of others—the many trials of patience and sources of discouragement which met them at almost every step. The class of persons whom they were addressing were not likely to enter very warmly into a project for introducing improved education, the advantage of which few of them were far enough advanced to appreciate; and all that could be hoped was, that here and there one among the motley group of Druggists and general dealers might, by some intuitive impulse, or for the sake of distinction, be induced to throw his influence into the scale. But before any signal success could be expected, it was necessary to call into existence the men who should at the same time reduce the theory to practice, and demonstrate its utility. The annual and gradually increasing supply of qualified Pharmaceutists sent forth by the Colleges of Pharmacy, became a regular source of reinforcement, and the professional character which they enjoyed reflected credit on the Colleges, and brought fresh aspirants into the field as candidates for a diploma. The *Philadelphia Journal of Pharmacy,* which originated in 1830, and was afterwards enlarged and continued under the title of the *American Journal of Pharmacy*, contains a record of some of these early endeavours to establish the cultivation of Pharmacy as a profession, and to call into existence a class of men qualified for the duty of dispensing medicine. By slow degrees at first, and more rapidly afterwards, these persevering efforts produced a favourable and permanent impression, and a sufficient number of intelligent and properly educated Pharmaceutists were distributed throughout the principal towns in the United States, to effect a regular organization of the profession. About the year 1850 further endeavours were used to bring about this result, and in October, 1851, a convention of Pharmaceutists and Druggists was held at New York by invitation of the College of that city, for the purpose of taking into consideration the best means of raising the character of the profession, promoting education, discouraging quackery and other disreputable practices, and introducing regulations for the guidance of the Members calculated to improve their status and advance their interests. In October, 1852, a similar Convention was held in Philadelphia, delegates from other cities in the United States being deputed to attend.

In August, 1853, the Convention was resolved into the American Pharmaceutical Association, and was held at Boston; in July, 1854, at Cincinnati; in September, 1855, at New York; and in September of the present year, at Baltimore. The Pharmaceutical profession has now become regularly organized, and the annual meetings afford the opportunity of discussing all matters concerning the interests of its members, reading papers on scientific subjects, establishing regulations of a voluntary nature, and taking such measures as occasion may require for procuring an amendment of the laws. The code of ethics to which all members of the association subscribe, has been published in this Journal (vol. xii., p. 369), and we have no hesitation in saying that if they act up to the professions expressed in this document, the Pharmaceutists of the United States are worthy of imitation; and the efforts spread over more than thirty years in bringing the association to its present position, have not been made in vain.

We have before us the report of the late meeting of the American Pharmaceutical Association, contained in the *American Journal of Pharmacy*, for November. The Association met, pursuant to notice, at Baltimore, on the 9th of September; the president, John Meakim, of New York, taking the chair. Delegates attended from the Massachusetts, New York, Philadelphia, Cincinnati, and Maryland Colleges of Pharmacy, and from the Apothecaries' Association of the district of Columbia, also from Boston and Washington. On the first day, the election of new members took place, and several Committees presented reports, namely:—the Executive Committee, the Committee on Prizes, on the Engraved Certificate of Membership, on Standards for the Quality of Drugs, on the Statistics of Pharmacy. It was recommended that the plan of offering prizes be abandoned, and that subjects should be suggested for individual research, with the understanding that if the result of the labours undertaken by any individual should be satisfactory and meritorious, a suitable reward would be given. On the second day, the officers for the ensuing year were elected; Mr. George W. Andrews, of Baltimore, having been elected president, took the chair, and the retiring president returned thanks. The revised constitution of the Association was then read, each article considered separately, and passed with a few amend-

s. As amended, it was ordered to be engrossed for adoption at a future g. Several scientific papers were then read, some of which will be found nother part of this *Journal.* Specimens of plants and Pharmaceutical chemical products were also laid on the table and discussed. At afternoon sitting, the report of a Committee on Text Books was being designed as an answer to the question, "What are the best text s published, for study and reference?" The works prominently men- d, in addition to the United States Dispensatory and the Pharmacopœia, are ira's *Materia Medica*, Mohr and Redwood's *Pharmacy*, Fownes' *Chemistry*, day's *Chemical Manipulation*, Gray's, Balfour's, or Lindley's *Elements of* *y*, *L'Officine*, by Dorvault, Gmelin's *Hand-Book of Chemistry*, &c. It was sted that a test book, more especially adapted to the Pharmaceutical nt, might with advantage be compiled. A long list of questions for scien- nvestigation, suggested by the Executive Committee, were then read, and r of them undertaken by members present. After the reading of several rs, followed by scientific discussion, the meeting adjourned.

the third day, September 11th, a discussion took place as to where the annual meeting should be held; and it was resolved that it should be held iladelphia. Standing Committees were appointed, namely, the Executive mittee, Committee on the Progress of Pharmacy, Committee on the ghts and Measures, with reference to the existing inaccuracy and discrepancy ose in use in the United States. It was also resolved, that the subject of sale of poisons by Pharmaceutists and others, and the legal means of aining it, be referred to a Committee of five members, to report in 1857; a Committee of five members was appointed to assist in reference to the Pharmacopœal Convention, in 1860, to report next year. The Committee Home Adulterations not having completed a report, it was resolved, the Committee be continued, and instructed to report, next year, he facts they can authenticate, and bring forward any recommendation ference to the enactment of State laws for controlling this evil which they deem advisable: and that the Members of the Association, and all others ested, be requested to forward to the Chairman of the Committee, C. B. rie (No. 12, Gold Street, New York), all information that they may ss bearing upon the subject. A Committee was appointed for the com- ion of unofficinal formulæ in local use with many Physicians of the United s, for the convenience of the Members of the Association. The engrossed of the constitution of the Association was then adopted as a whole, and is ed entire in the report of the Meeting. The term Pharmaceutist is adopted signate the Members of the Pharmaceutical profession, being considered rable to the compound title Pharmaceutical Chemist, usually employed in t Britain. Dr. Aiken, Professor of Chemistry and Examiner of Drugs of ort of Baltimore, presented a report, and exhibited a variety of specimens cted during the performance of his professional duties. At the afternoon g, several honorary and contributive Members were elected. The Com- e on Standards of Quality of Drugs for the use of Drug Examiners, having called upon to report, some discussion ensued, and it was resolved, that Executive Committee be instructed to take all necessary measures to urge e attention of the Secretary of the Treasury of the United States the views e Association relative to the qualifications necessary for an Examiner of s, should the entrance of a new Administration render such action neces- After some other routine business, the Association adjourned to meet in delphia on the second Tuesday in September, 1857.

e editorial report informs us that this was the most numerously attended interesting meeting hitherto held, that the greatest harmony prevailed, the itality of the Baltimore Members was abundant, and that the Members look ard to the next meeting with unusually favourable anticipations.

STUDIOUS HABITS—THE EXPERIMENT.

The hard fate of Apprentices and Assistants, has been for many years a fertile theme for complaint and vehicle for pathos. The case of the children of Israel, who were compelled to make bricks, but were allowed no straw, has been brought forward as an illustration of the perplexing condition of the Pharmaceutical student, whose daily toil is spread over twelve or fifteen hours, and who, nevertheless, is told that he must read and study. Imbued with a praiseworthy desire to qualify himself for his business, straining every nerve to finish his work that he may resume his book, exhausted nature recoils under the task, and he falls asleep over the first page; or, miscalculating his strength, he perseveres until the state of his health obliges him to relax. If we mention, as an aggravation of these disadvantages, a very insufficient supply of books, and in many instances the entire absence of scientific superintendence or training, we have a rather gloomy picture of the position and prospects of the junior members of the Pharmaceutical profession. Many meetings have been held, and forcible appeals made to the public, with a view of shortening the hours of business, and thus allowing more time for study. This, however, is only one part of the question; it is not sufficient that time be allowed unless the student has access to books of the right kind, and other means of improvement, and these could not be brought equally within the reach of all. It would be impossible to give apprentices in every country town the same advantages which may be enjoyed in the metropolis, or in some other places where scientific institutions or schools exist. Yet some improvement might be effected; a general curtailment of the hours of business for the avowed purpose of encouraging studious habits, would be a step in the right direction, and book-clubs or reading-rooms might be established in localities not provided with more complete educational arrangements.

In the year 1854, a rather energetic movement in favour of early closing took place. The subject was discussed at several meetings in London and the suburbs, some of which were convened by Assistants; in others a prominent part was taken by the proprietors of establishments. It appeared that a general desire to shorten the hours of business prevailed, but with regard to the mode of attaining the object, a struggle arose between precept and example. In some districts the leading Chemists entered into an agreement among themselves to close at a certain hour; an undertaking to this effect being sent round for signature, the general assent was obtained, and printed notices were circulated for the information of the public. In other places, the refusal of a few individuals to go with the stream, caused a failure of the attempt. The movement was not confined to the metropolis, but reports of proceedings being published in this *Journal*, and in some of the newspapers, the subject was taken up in various localities in the country, with a successful result in many instances. In the West-end of London a rather important change was introduced about the time referred to; the practice of closing partially at eight, and finally at nine, instead of eleven, as heretofore, was generally adopted, and has continued to be the rule in most respectable houses up to the present time. The Council of the Pharmaceutical Society, desirous of turning the circumstance to good account, opened the library every evening during the hours which had been reclaimed from the toils of business. Taking into consideration the number of young men residing within a moderate distance of Bloomsbury Square, and the profession of studious desires which had been urged at public meetings as a leading argument in favour of early closing, it was doubted whether the rooms of the Society would be capable of accommodating those who might be expected to attend. The experiment was tried. A brass plate was fixed on the door, to the effect that "the library is open from 8-30 to 10-30 p.m." The gas was regularly lighted, and the librarian in attendance. With a view of extending the benefit as widely as possible, arrangements were made for the circulation of books for the convenience of those who might prefer to study at home. A general invitation was issued to Members and Associates of the Society to avail themselves of the means of improvement thus afforded, and this appeal to young men of studious habits is from time to time repeated.

The result of the experiment, if not satisfactory, is instructive. The grievance of the Apprentices and Assistants is cleverly depicted by Mr. Ince as the "One Thing Forgotten," in a plausible appeal on behalf of injured innocence. What can be more touching than the hopeless enthusiasm and studious aspirations of these victims of the late hour system, bound hand and foot behind the counter until eleven o'clock at night, without any means of mental improvement? What would they not achieve, if time and opportunity were afforded them? In a central part of the metropolis, a locality very favourable for the experiment, the sincerity of these professions has been put to the test. Shops have been closed at eight or nine (instead of eleven), a convenient place for study has been provided, and how many have availed themselves of its advantages? Sometimes one or two may be found in the library—sometimes none. We know that a considerable number of young men are liberated from business at eight or nine, that many of them go out (to study of course), that they are not to be found in the Library of the Society—where do they go to prosecute their studies? Do some of them study at home, taking advantage of the extensive supply of works in the library? The number of volumes taken out per diem for this purpose is not at the present time on an average more than two or three, and what are they among so many? It would be satisfactory to ascertain when, where, and how, our young friends derive benefit from the earlier closing of shops in the locality in which the experiment has been tried; to what extent their studious habits have grown with the opportunities afforded for study; and what encouragement, therefore, there is for continuing and endeavouring to extend the existing privileges.

In raising these questions, we have no wish to lay down the law with regard to the mode in which knowledge is to be obtained. Whether the student reads books by stealth or frequents a public library, whether he attends the lectures at the house of the Society or in any other school, or whether he depends on his own perseverance and private study, are questions which each individual must decide for himself, and the wisdom or otherwise of such decision will be apparent when the Board of Examiners is called upon to test the qualifications of the several candidates. The Society provides the most complete and efficient facilities for study, a disposition prevails to allow more time, by shortening the hours of business, and the question we have a right to ask is, whether the privilege is used or abused by those for whose benefit it is intended?

THE DENTAL PROFESSION.

Similarity of circumstances induces sympathy between kindred professions The present position of the Dentists, from which they are about to extricate themselves, is analogous to that of the Chemists and Druggists prior to the year 1840. They are beginning to open their eyes to the necessity of taking their affairs into their own hands, and becoming a corporate body. Not recognized as a branch of the medical profession, and having no separate existence, they scarcely know where they are, or of what materials they are composed. There is no dictionary which defines precisely what a Dentist is, nor Act of Parliament reciting what he ought to be. His occupation is both a profession and a trade. His skill may tend to the preservation of health, comfort, and beauty, the alleviation of pain, the procrastination of old age: his power over the hopes and fears of his patients, his admission to their confidence in reference to personal defects, and their natural aversion to exposure, place them almost entirely at his mercy, and hence the *trade* of a Dentist, when carried on as such by the advertising quack, affords remarkable facilities for fraud and extortion, and is accordingly resorted to by a great variety of ignorant and unscrupulous persons. When other business has failed, and even the coal trade has been tried without success, the Dental persuasion is embraced by way of a last resource—as a drowning man catches at a straw. The mechanic in ivory, who has assisted in modelling a few sets of teeth, the Dentist's footman, who has shown hundreds of patients into the operating room, and kept the instruments clean, the dissecting room attendant at an hospital, who is proficient in extracting teeth from the dead subject, and many other persons with even less pretensions to skill and experience, enter the lists as guardians of the public teeth, and advertise their succedaneums, amalgams, balsams, and odontalgic applications. Some of the most bold of these adventurers make large incomes, and drive spotted horses in the park; some of them exhibit spotted or carious teeth ingeniously arranged in glass cases; others display dissected jaws, gutta-percha gums, and the gnashing of teeth by clock-work. Some of these dental stars migrate. Prior to their arrival at a fashionable watering-place, advertisements appear in the local papers addressed to the nobility, gentry, and inhabitants generally, announcing the approaching visit of Mr. ———, from London, for a few days only! Hand-bills containing further particulars, with lists of charges, are distributed by small boys in gay livery with a profusion of buttons. If orders come in briskly, the departure is postponed "for a few days only by particular desire," and when business begins to flag the scene is shifted to some other locality. Sometimes a set of teeth, for which the low price of twenty guineas has been paid, proving useless, the patient is advised to have a superior set, price thirty guineas, five guineas being allowed for those which did not fit. The second set being found little better than the first, he returns to complain, but the professor has migrated, like the swallow, to another clime.

With less pretensions to professional dignity, but coming within the category of dental practitioners, we may notice the "sole inventors and vendors" of specifics for the cure of toothache, scurvy in the gums, foul breath proceeding from decayed teeth, &c. We have a specimen before us, which will serve to illustrate the genus, and their mode of transacting business. It is a circular sent to chemists, grocers, and others:—

NEW DISCOVERY. DIEU AIDANT. NOT QUACKERY.
TOOTHACHE CURED IN ONE MINUTE.
In Bottles 6*d.* and 1*s.* By Post, 8*d.* and 15*d.*
——— & SON, GROCERS, L———R.
Warranted harmless—yet effectual.
Sole Agents: ———————, London.
———————, Dublin.
———————, Edinburgh.
———————, Bangor.

"Sir,—The sole agency for the above is respectfully offered to you for your Town. The article is fully established—we sell 140 to 190 Bottles every week at our retail Grocer's shop; 73 in one day; 68 the next. Some have been 6 times over for their friends; a great many twice. We often sell 3 at a time; have cured them in the shop repeatedly, and you need not hesitate to do the same at any time. A patent medicine license is required. Price to agents is 6*d.* bottles, 4*s.* ½*d.*; 1*s.* ditto, 7*s.* 7½*d.* per doz. 3 months nett. Carriage paid.

"You are quite welcome to a gross of 6*d.* on sale or return.—Yours most obediently, ———."

These grocers can scarcely be included among the fraternity of Dentists; but they cure toothache in the shop, and this is the first step with some persons. For a few shillings a set of forceps is obtained, and by degrees a dental surgery rises up, with a show-glass in the window, and a workman behind the scenes to make the teeth.

In many country towns tooth-drawing is a regular part of the business of the Chemist, and we sometimes see small transparencies in the windows, with these words, "Cupping, bleeding, and teeth extracted." In the present state of the law and professional usage, the transition seems to be easy and natural—from curing toothache and extracting teeth, to the other departments of dental surgery. It is a fact that several of the most eminent dentists of the present time were in former years chemists and druggists; having a mechanical talent, reference for the profession, they relinquished Pharmacy and qualified lves as Dentists.

forced from such a variety of sources, and consisting of such heteroge- lements, the dental profession can scarcely be said to have enjoyed any existence. Each successful practitioner has been the architect of his tune; and, having his time fully occupied, has not troubled himself to into the antecedents of his neighbours, or to make provision for the on of the future members of his profession. But the materials for g a regular organization exists; a movement is taking place with this and, by perseverance and unanimity among the parties concerned, a ul result may be ensured.

ould be borne in mind that the foundation of professional status is edu- and, inasmuch as the functions of the Dentist are of a compound nature, scribed training should correspond.

e absence of a special qualification for the grade of Surgeon-dentist, the dopted by those who desire to take the highest position consists in becom- lows of the College of Surgeons. In obtaining that distinction, they do ings which they might have left undone, and leave undone those things they ought to have done. While studying aneurisms, hydrocele, and hey might have been more usefully employed in acquiring pliability of lation and mechanical dexterity. A surgeon, after having obtained the honours at College, may find that to become a dentist he must begin the its of his art at a period of life at which "the power of mind over ' is not easily acquired, except by those who are gifted by nature with ual mechanical talent. The training of the fingers is an important part ducation of a Dentist; and a practical familiarity with the art and sm of adapting teeth should be comprised in his examination. We imagine that there would be much difficulty in effecting the desired ment, by the appointment of a Special Board of Examiners by the Col- Surgeons, constituted with reference to the dental profession, and em- l to confer the degree of Surgeon-dentist. But whether the object is to ned by an amendment of the Charter of College, or by some other s a matter of detail.

rst step to be accomplished is the constitution of the Association which resent the faculty of Dentists. The movement has commenced in two y the simultaneous action of parties having the same object, but acting rent principles. The Odontological Society, originating among the members of the profession, is rather exclusive in its constitution. Its , taking into consideration the extreme importance of unanimity, formed nucleus in the first instance, to make preliminary arrangements, adding t from time to time other members who were disposed to co-operate. iety of Dentists was constituted at a meeting convened by public ment, and its list of members is much more numerous and miscellaneous. btful whether the elements thus promiscuously brought together will ze, and sustain the professional character which such a Society ought s. On the other hand, it is possible for exclusiveness to be carried to me. The primary object of the Odontological Society, as shown in the rom the bye-laws in another part of this number, is to maintain the ility of the profession by excluding the advertising fraternity. But, isting circumstances, the line of demarcation is not clearly defined, and neither be fair nor politic to enforce the restrictive regulations in the nce, to the same extent that might be desirable in the course of a few en a standard of professional ethics has been established and is under- We sincerely hope the preliminary difficulties of the undertaking will be overcome; and the above suggestions are founded on the experience during the formation and progress of the Pharmaceutical Society.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

Wednesday, November 5th, 1856,

MR. JACOB BELL, PRESIDENT, IN THE CHAIR.

THE following donations to the Library and Museum were announced:—

Journal of the Society of Arts, from the Society.
Journal of the Photographic Society, from the Society.
Notices of Meetings and List of Members of the Royal Institution, from the Institution.
Histoire Naturelle du Cocotier, par C. Reynaud, from the Author.
A specimen of Egusé Oil, from Dr. Daniel.

ON THE CHARACTERS OF DANDELION ROOT (LEONTODON TARAXACUM), AND THE MEANS WHEREBY IT MAY BE DISTINGUISHED FROM OTHER ROOTS.

BY ROBERT BENTLEY, F.L.S., M.R.C.S., &c.,
Professor of Botany and Materia Medica to the Pharmaceutical Society of Great Britain, &c.

MY attention has been especially directed to the above subject from the circumstance of a well-known Chemist in the city having forwarded to the Pharmaceutical Society a parcel of dried roots, which had been sent to him by the herbalist as dandelion, and which he thought were of a suspicious nature, and requested an opinion as to their character. Upon examining the parcel, I found that this so-called "Dandelion root" was a mixture of several roots, the dandelion itself constituting only about one-third of the whole. The substitution or mixture of other roots with that of dandelion in such a wholesale way, is of such serious consequence, when we consider that many tons of it are used annually in this country, that I have brought the subject under the notice of the Society.

The roots thus mixed with dandelion were of various kinds, some of foreign origin; some derived from indigenous plants; such as *ginseng*, *gentian*, *chicory*, *tormentilla* apparently, but too broken to pronounce positively, and portions of others. The mixture of the above roots with those of dandelion was in this case clearly accidental, or arose from ignorance, for if roots had been purposely mixed with it, care would have been taken to have used those for the purpose which were of less value than it, whereas here, one of the roots especially, namely, *ginseng*, was of far greater value. From whatever cause, however, such a mixture was occasioned—whether accidental or otherwise—it is an illustration of the carelessness with which Pharmaceutical Chemists are sometimes supplied with substances by the herbalists (and under such circumstances intensely poisonous roots might quite as likely have been mixed with dandelion), it becomes therefore of essential importance that they should be able in all cases to distinguish dandelion root from others. The importance of this inquiry is also enhanced by the probability of the dried root being ordered to be used in the next Pharmacopœia. The following are the characters presented by dandelion root when dried:—

GENERAL DESCRIPTION.

It varies in size from pieces about the diameter of a common quill, or even smaller, to that of the thumb, or in some cases much larger, but these excessively large roots should not be used for Pharmaceutical purposes; the average size is that of the little and ring fingers, in which state they are also most active.

In length it varies considerably, and it is usually more or less twisted. Generally the root presents a contracted and more or less shrivelled appearance (fig. 2). It breaks readily with a short fracture, and has a corky, or somewhat spongy texture. In colour externally it is dark brown, with a yellowish or slight reddish tinge. By keeping, the roots become darker, frequently almost black. It is marked externally with deep irregular longitudinal furrows, frequently extending to some distance, and numerous superficial ones (figs. 1 and 2). These furrows are well seen in the transverse sections (figs. 3, 4, 5). Scattered irregularly over the surface may be also observed a number of irregular prominences of various sizes, produced by the breaking off of the smaller divisions of the root (fig. 2). There are generally no transverse furrows or annular ridges on the pieces of the root, except these have been derived from near the crown or point where the leaves arise, in which case some irregular ones may be observed, extending partly or entirely round the root. Upon some roots I have observed numerous annular ridges or furrows, but such are exceptional than otherwise. Upon making a transverse section, or breaking the root, we observe distinctly two portions, viz., a cortical or external layer, and an internal woody axis or meditullium (figs. 3 and 4). The cortical portion is of a whitish colour, and presents a corky, or spongy texture. Its diameter is generally twice or three times that of the meditullium, and frequently more than this. It presents a number of distinct concentric rings, like the rings of wood commonly observed in a transverse section of an exogenous stem, each of which is separated from the other when the roots have been kept any time by a brownish line (figs. 3, 4, and 5).

This cortical region is separated from the meditullium by a distinct darker coloured line (figs. 4 and 5), within which the meditullium is seen of a decided yellow colour, at least if the roots have not been kept very long, but even if such be the case, the yellow colour may be generally observed to some extent, although in some instances it entirely disappears. In young well-formed roots the meditullium is generally cylindrical, but it is sometimes more or less irregular in outline (fig. 5), and in very old roots it is occasionally absent, and a hollow space observable instead of it. Dandelion root has no particular smell, but it has a more or less bitter or sweetish taste, according to the season in which it has been collected. Such is a detailed description of the physical characters of the root; we now pass to describe its chemical characteristics.

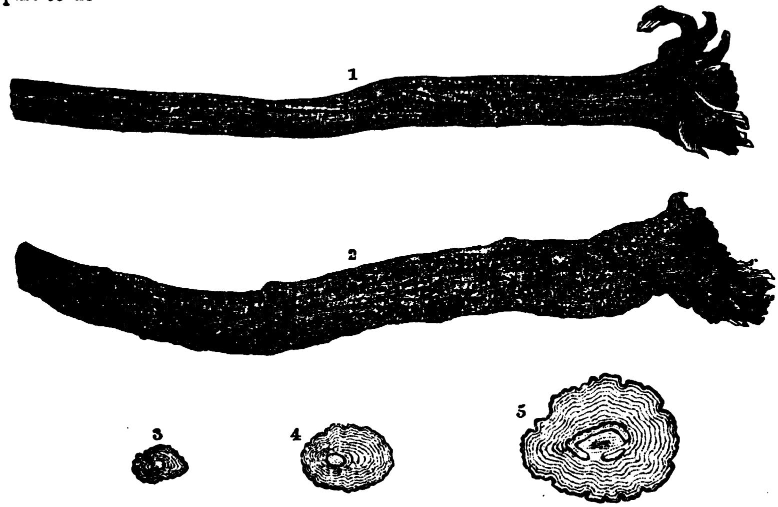


Fig. 1. External appearance of dandelion root, showing longitudinal furrows. Fig. 2. Outer surface of a larger root, showing its contracted appearance, and presenting irregular prominences.

Figs. 3, 4, and 5. Transverse sections of roots of different diameters, to show the comparative size of the meditullium and cortical region; the concentric layers of the latter; and the deeply-furrowed external surface of the root. The above figures show the roots of their natural size.

CHEMICAL CHARACTERISTICS.

If a weak solution of iodine be applied to a transverse or longitudinal section of the root, the cortical portion immediately assumes a decided brownish-yellow colour, indicating the presence of *inuline*. At the same time the concentric layers are rendered even more evident than they were before. The meditullium also acquires a darker colour.

If concentrated sulphuric acid be applied to a transverse section of dandelion root, the meditullium immediately acquires a darker colour, and at some points it becomes deep black. The cortical region is at first almost unaltered, but it gradually assumes a rose-pink colour.

When nitric acid is applied, it has no immediate influence upon the cortical region, but it causes the meditullium at once to acquire a gamboge yellow colour, which ultimately changes to brown. When ammonia is added to the transverse section, it communicates at once a bright but light yellow colour to the meditullium and to the lines separating the layers of cortical integument, the intervening spaces remaining almost unaltered.

I do not consider these chemical tests so valuable as the structural, but I place them here because, in many doubtful cases, especially if the substituted roots be derived from a different natural order, they will be found important guides. These characters again will probably vary somewhat according to the season that the root has been collected; the above apply to the autumnal root. Such are the general physical and chemical characteristics of dandelion root in a dried state.

If we now turn our attention to the recent undried root, we shall find that the latter internally, in all essential points of structure, resembles it. There is the same distinction into the two layers, cortical and woody, to be observed; the arrangement in concentric layers is also evident in the cortical region, and also the same proportions observable in the diameters of the two regions respectively. The only difference to be noticed is, that in the fresh root a large quantity of milky juice exudes when it is broken asunder. The escape of this milky juice, when abundant, render somewhat obscure the appearance of concentric layers in the cortical region, but as the flow of juice diminishes, these become at once evident.

In the action again of [iodine, sulphuric acid, nitric acid, or ammonia, nearly the same changes may be observed as when these substances are applied to the dried root, but they are generally less evident, and the effects are not so quickly observed.

The fresh root also breaks readily, and with the short fracture already noticed as occurring in the dried root.

In its external appearance, however, the fresh root presents some differences. Thus, it is of a much lighter yellowish-brown colour; of a plump appearance, instead of being contracted and shrivelled; and without longitudinal furrows; but it possesses the same irregular transverse ridges near to its crown.

Its taste is also generally more bitter, the dried root commonly losing some of its bitterness in the process of desiccation, especially if this operation has not been very carefully conducted; and as the properties of dandelion root appear to reside in this bitterness, we see the importance of drying it as carefully as possible.

The physical and chemical characters given above of both dried and recent dandelion root, are so remarkable, and so characteristic, when taken generally, that I know of no root, whether of foreign origin or indigenous, that is at all likely, if ordinary care be used, to be mistaken for it. The characteristics which I would especially lay stress upon, and which are applicable whether taken recent or dried, are—1st. The manifest distinction which it exhibits internally of a division into two regions. 2nd. The large diameter of the cortical region as compared with the meditullium. 3rd. The separation of this rtical region into distinct concentric layers. This character will, I believe, one distinguish dandelion root from all others that are found mixed with it, nd as such, therefore, is a very valuable one. 4th. The yellow colour of the editallium, as contrasted with the whitish colour of the cortical region. h. The yellowish-brown colour it assumes when acted upon by a solution of dine. And 6th. The rose-pink colour exhibited by the cortical region under e influence of sulphuric acid.

Since writing the above, I have examined various specimens of recent andelion root, and I have found various roots, such as those of *chicory*, *hawkbit*, rious kinds of *dock*, *horse-radish*, and others, mixed with it. I need scarcely mark how important it is to have characters in dandelion root which will adily distinguish it, as the presence of some of the above roots in a parcel of ndelion would materially influence the character of the extract, or other roduct which it was wished to obtain, such especially would be the case with orse-radish root even in small quantities. In all these cases, as in the former, e characters above given of the root will at once distinguish it from them; indeed, e appearance of concentric rings presented by the cortical region in dandelion ot is of itself sufficient. I have also tried these characters not only with the ots mentioned above, as occurring in dried and recent dandelion root, but lso with those of various of the Compositæ, as *Apargia autumnalis*, *Picris ieracium*, *Senecio vulgaris*, and *aquaticum*, several *Hieracia*, *Chrysanthemum eucanthemum*, species of *Sonchus*, *Tragopogon pratense*, and several others. In ll these cases, also, I found the distinctive characters between their roots and ose of dandelion so well marked, that I do not think it necessary to increase he length of what I hope will be found a practical paper, with any further remarks respecting them.

Mr. Squire was glad this subject had been noticed. If the College of Physicians should think it desirable to recommend that dandelion root be kept or use in the dry instead of the moist state, it would be important that the characters by which it may be distinguished from other roots should be generally known.

Mr. Whipple recollected a case in which a druggist, having ordered dandelion root, received a parcel consisting entirely of chicory root, which had been substituted for it by mistake.

ON EGUSÉ OIL, A NEW VEGETABLE PRODUCT FROM WEST AFRICA.

BY W. F. DANIELL, M.D., F.L.S.,

Honorary Member of the Pharmaceutical Society.

The facility of intercourse established within the last few years between Sierra Leone, and the distant countries of Yorruba, has led to the introduction of several important plants into that colony. Many interesting productions have thus become naturalized, and successfully reared on the larger farms of the agricultural settler. The annual amount of produce recently furnished from these sources has been unusually great, and considerable attention has therefore been directed to a few of these products, the collection of which, by the mercantile communities of Western Africa, might prove sufficiently remunerative to answer for exportation to Europe. No doubt, however, can exist, that not only these, but other indigenous commodities, now comparatively unknown, and limited in utility, must, in the course of time occupy no insignificant position among the exports from our African colonies.

Among the various cucurbitaceous plants in ordinary cultivation by the prædial races of Haussa, Bornou, and other inland kingdoms of Soudan, may be enumerated a few species of gourds, the seeds of which, are not only held in universal esteem, but constitute lucrative articles of commerce, on account of their manifold economical appliances. Of these seeds two kinds were originally imported from Lagos, by the Yorrubean name of *Egusé*, and, though each kind was probably produced by a distinct plant, yet both were comprehended under the common designation of *Barra*. They soon became dispersed throughout the native villages by the Ako traders, and, not being difficult of culture, were extensively grown on the country farms and waste tracts of land, and are now profitably retailed by their inhabitants in the markets of Sierra Leone, where they are purchased with avidity, as one of the standard constituents of various country dishes.

The size and form of these seeds will easily point out their distinctive characters, and the particular product from which each sort can be obtained. The larger species are recognized by their exclusive appellation of "*male Egusé*," as the lesser, and other delicate varieties, are, by the equally expressive term of "*female Egusé*." Both are planted in April or May, previously to the commencement of the rainy season, and the young shoots soon overrun a large extent of ground by their rapid and exuberant growth. As the plants attain their full development, numerous auxiliary clusters of pale yellow flowers appear in August and September, and continue increasing until December. The fruit of the "*male Egusé*" is a succulent gourd of an oblong or cylindrical shape, from twelve to eighteen inches in length, and four or five inches in diameter.* Embedded chiefly in the central portion of the pulp are numerous white, narrow ovate, and compressed seeds, nearly an inch long, enclosed in a tough coriaceous coat. They ripen in February and March, and frequently at a much earlier period. The "*female Egusé*" plant is usually attached to the fences of the village gardens, roofs of houses, or adjacent clearances, and both the fruit and seeds are considerably less in magnitude than the preceding. The gourd also is pendulous, and of a more oval or globular form, sometimes oblong-obovate, and seldom exceeds six or eight inches in length. Both species of fruit are at first green, which, as they approach maturity, gradually changes into a greenish white, or pale straw color, and the rind then becomes exceedingly hard and solid.

These seeds, in a fresh state, possess an agreeable nutty flavor, approximating to that of the young almond or hazel-nut. Their bland and nutritious properties render them very palatable adjuncts to the native edibles, and so highly are they appreciated, that a ready sale is invariably commanded in the localities where they abound. From both kinds, but more especially from the "*female Egusé*," a valuable and wholesome oil is procured, of a rich golden hue, and of a somewhat pleasant taste. A few days after the gourds have been gathered, they are longitudinally divided into two equal parts, and either suspended from the roof over the fire or exposed to the sun, to facilitate the evaporation of the fluid portions of the pulp. The seeds are then picked out of their fleshy beds, well dried in the sun, and preserved in covered calabashes.

The country process by which the oil is obtained is as follows. The seeds are first carefully divested of their external sheaths by gentle pounding in a wooden mortar. They are repeatedly washed, cleansed from impurities, dried in the sun, and partially parched in a pot over the fire. Thrown again into a mortar, the whole are beaten into a rough pulp, and finally rubbed between two stones until reduced to a fine paste. This is strongly compressed between the hands, when a certain quantity of oil oozes forth, and the paste frequently reparched over the fire, until successive manipulations exhaust all further supply. The oil is allowed to remain in the vessel for some time, to permit of its clarification. With the paste some native tribes occasionally mix a few eschalots, with bird pepper (*Capsicum fructescens* L.) and salt, which bestows on the oil a peculiar piquancy.

Although *Egusé oil* is resorted to chiefly for dietetic purposes, and is introduced into the composition of many native dishes, especially with the preparation of corn termed *Akkarah*, it is nevertheless often employed for various medi-urposes. Yorrubean authorities assert that the habitual use of the seeds article of food exerts a beneficial influence on the intestinal canal, and, h acting as a gentle laxative, averts the attacks of dysentery and diar-which may probably be owing to its oleaginous and deobstruant qualities. mollient application, the oil has been considered, not only to soften the d render it cool, but to excel the oil of *Benné* (*Sesamum Orientale* L.), in g certain forms of leprous ulceration, and indurated cuticle, with which abitants of several districts in Soudan are much afflicted.

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* Closely resembling in form the vegetable marrow, *Cucurbita ovifera* W.

ll cakes are made from the seeds in Yorruba. The oil is sold in Abbe-it from two shillings to a dollar per gallon, according to the produce of the When pure it is an excellent substitute for salad oil, and is equally or the lamp, burning with a bright clear flame.

Vilson, Esq.,* to whom samples of this oil have been submitted, expresses rable opinion of its commercial value, which he considers about equal ning purposes, &c.) with rape oil, although he doubts whether the market rould exceed the "East Indian seed oil known as *Sesame*." For the tion of machinery and other analogous appliances, he is also of opinion natural qualities are sufficiently valuable to merit attentive consideration.

ON CRYSTALLIZED HYDRATE OF BARYTES.

BY FREDERIC MOHR, PH.D., COBLENTZ,

Honorary Member of the Pharmaceutical Society of Great Britain.

TIC barytes has been hitherto prepared by calcination of nitrate of , or by boiling a solution of sulphuret of barytes with oxide of copper. t process has been improved by me, by mixing the nitrate of barytes arsely powdered native sulphate of barytes, and heating the mixture in a e. By this simple manipulation the rising and overflowing of the fused been entirely prevented. It has constituted until now the most expe-and the cheapest process for preparing the crystals of hydrate of barytes.

new process, for the first time here to be published, consists in precipi-caustic barytes by a solution of caustic potash or soda. The caustic soda ared from a pure carbonate of soda and caustic lime by the common method ing them together in a cast-iron vessel, until a filtered portion shows no aces of carbonate of soda. The warm liquid is left covered for sedi-ion, and after some hours' time, the perfectly clear liquid is taken off by syphon.

is the solution of caustic soda to be used for preparing caustic barytes. To in the quantity of any salt of barytes which can be decomposed by caustic e alkalimetric strength of the soda must be previously determined. For this e ten cubic centimetres are taken off by a pipette, some drops of tincture us are added, and then the strength is determined by a solution of oxalic a certain and known strength, which is added until the colour is changed . The strength of the solution of oxalic acid is prepared in the way lly suggested by Mr. J. J. Griffin, and recommended in my book *Die ethode*, for volumetrical analysis. A litre of the solution contains sixty-grammes of crystallized oxalic acid, thus representing the atomic weight acid. A cubic centimetre of this solution is therefore equal to $\frac{1}{1000}$ atom alkali. Supposing, then, that eight cubic centimetres of this solution were ed to redden the litmus in ten cubic centimeters of the caustic soda, bic centimetres of the latter would decompose one atom of any salt of s. Ten cubic centimetres of the solution of oxalic acid is the hundredth f a litre, and one litre of the acid will saturate an atom of caustic soda.

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* Price's Patent Candle Company, Vauxhall.

Therefore the number of cubic centimetres of the solution of soda required to saturate ten cubic centimetres of the solution of oxalic acid, must be multiplied by 100 to find the quantity required for one atom of a barytic salt. 800 cubic centimetres of this caustic soda would decompose 122 grammes of crystallized chloride of barium, or 130½ grammes of nitrate of barytes. The first named salt is the cheaper and easier to be prepared; but when any trace of chlorine is to be avoided in an investigation, the nitrate of barytes should be preferred.

The solution of caustic soda is boiled in a cast-iron pan, and the weighed quantity of the barytic salt added to it. A precipitate will be produced in all cases, because the caustic soda is hardly free from carbonic or sulphuric acid.

The decomposition will be complete as soon as the barytic salt has been dissolved, and the insoluble product may be easily separated, in consequence of the great solubility of caustic barytes in boiling water. It may be effected by filtration, but the process of sedimentation will be found to be far more expeditious. With this view the liquid is left covered for some time in a warm stove, not hot enough to cause ebullition or the disturbance of the sediment, but sufficiently hot to prevent crystallization.

The precipitate of carbonate and sulphate of barytes is deposited very quickly, and after half an hour the liquid will be clear enough to be taken off by a syphon. It is put into suitable vessels of iron, china, or glass, from which free access of air is excluded, and set aside in a cool place to crystallize. The whole liquid often crystallizes into a solid mass of acicular crystals of caustic barytes, the mother-liquor being entirely absorbed by the mass. The crystals are put into a funnel, and when the greater part of the liquid has drained away, the funnel is placed in an oblique direction in a centrifugal engine, and by the rapid motion of the engine much of the remaining mother-liquor is thrown off. The crystals are thus got in a state in which they will hardly wet filtering paper when placed upon it. By re-dissolving in a small quantity of boiling distilled water, and crystallizing a second time as before, the crystals are obtained in a sufficient state of purity.

By this means large quantities of caustic barytes can be prepared at a cost not much greater than that of a common salt of barytes, and this substance may therefore be applied for purposes for which it was previously inapplicable on account of its high price.

I may be permitted here to allude to the preparation of caustic potash for mineral analysis. It is very difficult to obtain caustic potash from the carbonate, so as to be free from silica, chlorine, and sulphuric acid, but sulphate of potash being free from silica and chlorine, and one of the purest of the salts of potash, it is very easy to prepare the caustic alkali from the sulphate by means of caustic barytes. If the barytes has been made from the nitrate, it will contain no chlorine; silica cannot be present, and sulphuric acid will be completely precipitated.

Common caustic potash, which has been prepared with carbonate of potash and lime, can be deprived of the last traces of carbonic and sulphuric acids, by adding the requisite quantity of caustic barytes and leaving the mixture for the precipitates to subside. This cannot be effected with caustic lime, as that substance is too little soluble in water, and is, moreover, incapable of decomposing sulphate of potash.

A solution of caustic barytes is used for absorbing carbonic acid from gases; but in this case, as the absorption proceeds, the solution becomes progressively weaker. I have suggested the use of a mixture of caustic potash and barytes for the same purpose, with complete success. The caustic potash absorbs the carbonic acid, and the barytes precipitates it. In this way the absorbing liquid —the potash—is kept always of the same strength and completely caustic, while the carbonic acid, as it is absorbed, is eliminated by precipitation.

Carbonic acid is more difficultly absorbed in proportion to the extent of its admixture with permanent gases which are not subject to absorption. This is experienced in the analysis of atmospheric air, where there are only r five volumes of carbonic acid in ten thousand volumes of the air. the determination of the quantity of carbonic acid in air has been ed with much uncertainty and difficulty. The simple absorption by solid nces in tubes, and the determination of the increment of weight, as ed by Brunner and other chemists, has given most erroneous results. process the air must be completely dried by sulphuric acid or chloride of a. Now, it has been found that sulphuric acid absorbs no inconsiderable ty of carbonic acid, which will not be got in the tube in which that body osed to be estimated. Then chloride of calcium is decomposed by the of the atmospheric air, and loses an atom of chlorine for every atom of oxygen or ozone. The chlorine thus disengaged is absorbed by the potash or lime, and causes an increment of weight, which would be ously ascribed to carbonic acid. Thus, in some cases in which the air has ery dry, the chloride of calcium has lost rather than gained weight by the e of the air through it.

as, therefore, been found necessary to recur to the old process of Saussure. ne trouble of exhausting large balloons by an air-pump, the costliness of ole apparatus, and the impossibility of transferring it from place to place, revented Chemists from generally adopting this process. Hence Saussure's stand alone, being unsupported by parallel experiments. It has, how- een found practicable to effect the complete absorption of carbonic acid tmospheric air with a mixture of caustic potash and barytes, by causing the ass through a glass tube of from sixteen to eighteen inches in length, and quarters of an inch in diameter, placed in an oblique direction. The current s produced by the dropping of water from an aspirator in connexion with sorbing apparatus. Single bubbles of air rise in slow succession through liquely-placed tube, and are thus kept for about ten seconds in contact he absorbing liquid. The air passes into the apparatus in its ordinary deprived neither of moisture nor ozone, as these substances do not inter- ith the result. The volume of air is ascertained by measuring the water, ducing it for pressure and temperature. The carbonate of barytes from r fifty litres of air is so small a quantity, that it cannot be well determined ghing it upon a filter, and I have adopted the method of determining this ty by a solution of nitrate of silver, which gives uniform results and is ccurate. This process is described in my work on Volumetrical Analysis. onclusion, it may be predicted, with great probability, that caustic barytes once easily and cheaply prepared in large quantities, will be applicable, ly to scientific researches, but also to industrial and commercial purposes.

Redwood said the Society was much indebted to Dr. Mohr for this le practical paper. The method suggested for the preparation of lized hydrate of barytes appeared to be a very good one. The proposed tions of caustic barytes were also well worthy of consideration, especially hich related to the production of pure liquor potassæ. This was often ed for analytical purposes, and Chemists not unfrequently found it difficult in the preparation in a sufficient state of purity to render it suitable for some cases, as, for instance, in the separation and estimation of alumina. l, as Dr. Mohr suggested, for purifying the liquor potassæ made in the way, much caution should be exercised to avoid leaving baryta in the n, especially if it was intended for use in medicine, as barytes possesses ous properties.

Daniel Hanbury drew the attention of the meeting to a specimen of the

ROOT OF *ACONITUM HETEROPHYLLUM* Wallich,

sting which, he read the following communication from Dr. Thomas son, superintendent of the Botanic Garden at Calcutta:—

"*Botanic Garden, Calcutta*, 7 *April*, 1856.

"My Dear Sir,—The Agri-Horticultural Society here, having received from a correspondent in the upper provinces a quantity of the powdered root of *Atees*, *Aconitum heterophyllum* of Wallich, which has a considerable reputation as a febrifuge and antiperiodic medicine in India, and which, from the accounts received, appears certainly to merit a trial, I have recommended them to send a portion of it to you, thinking that you would like to see this medicine; and they have accordingly forwarded a sample of it by the present mail, with instructions to send it to you on its arrival in London.

"Though an Aconite, I believe the root or rhizome of *A. heterophyllum* to possess no poisonous properties; but, on the other hand, I am not sanguine as to its being found a valuable antiperiodic. It has been given in doses of a scruple to a dram. You will find it noticed in Royle's *Illustrations*.*

"Believe me, yours very truly,

"THOMAS THOMSON."

The drug in question has the appearance of a white farinaceous powder.

Mr. HANBURY said he should be glad to place the specimen in the hands of any medical man who would give it a trial.

TEST FOR NARCOTINE.

Mr. MACFARLANE said, that he almost felt it necessary to apologise for occupying the time of the meeting with so small a matter as the correction of an error in an alleged method of detecting the presence of narcotine in the salts of morphia, contained in a statement which had been sent him. He had thought it sufficient to send a note on the subject for insertion in the Journal, but the President, thinking it better to give him an opportunity of pointing it out to the Society, had deferred the communication, and he would now avail himself of the privilege, hoping that it might prove not altogether uninteresting to his fellow members.

The statement to which his attention had been called was, that the salts of morphia in solution with tartaric acid do not give a precipitate with any alkaline bicarbonate. The narcotine salts will give a precipitate.

This statement, he understood, had been made in the Handwörterbuch der Chemie, on the authority of Oppermann. Not having seen the original, and having found the same statement in Gerhardt, Traité de Chimie Organique, troisième partie, made on the same authority, he would give it in his words:—"Additionnés d'acide tartrique, puis sursaturés par un bicarbonate alcalin, les sels de morphine ne sont pas précipités. (Oppermann), p. 33."

"Additionnés d'acide tartrique, puis sursaturés par un bicarbonate alcalin, les sels de narcotine donnent immédiatement un précipité blanc pulvérulent." P. 66.

The statement in regard to the salts of narcotine is correct, but not so in regard to those of morphia, as the salts both of morphia and narcotine do give precipitates with alkaline bicarbonates, whether tartaric acid be present or not. There is, however, a difference in the behaviour of the salts and in the appearance of the precipitates which requires to be noticed, and the more so, that it may, in some degree, serve to explain the error into which Oppermann has fallen. Thus, on adding to a salt of morphia in solution with tartaric acid (it may be any salt,—acetate, bimeconate, citrate, muriate, nitrate, sulphate, tartrate, all having been found to act very much alike), the solution of alkaline bicarbonate, the morphia separates slowly—so that it may be needful to wait and agitate the fluid before the precipitation begins; nor is it till the liquid has become decidedly alkaline that it appears, but then it goes on, and the precipitate falls down in the form of a white powder, more or less distinctly crystalline, according to the strength of the solution; while, on adding a similar solution of alkaline bicarbonate to a solution of salt of narcotine, the narcotine separates, at once, in the form of a white precipitate. So long, however, as the mtinues acid, the salt of narcotine, as well as those of morphia, are held on—for, though a separation takes place on the addition of each drop of line solution, it is re-dissolved on sinking, until it approaches the point ation, when it is thrown down in the form of a white pulverulent powder. difference may be easily accounted for by the difference of the two bases, being a strong, the narcotine a weak base, and its salts crystallizing at difficulty. While the difference between the precipitates is thus in, it will be rendered still more manifest by adding caustic potass, (aq. to the liquid, which will re-dissolve the morphia, but have no effect what- the narcotine, though added in a large quantity. In this, way were both sent, they could be easily detected, separated, and even estimated with accuracy. The morphia being entirely soluble in the caustic alkali, e narcotine is totally insoluble. Indeed, the simplest and readiest method taining whether a salt of morphia is free from narcotine, is to dissolve it otass. If it makes a clear solution there can be no narcotine present.

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* *Illustrations of Botany of the Himalaya and Cashmere.*

ssor Redwood having kindly prepared solutions of the different salts, then exhibited to the Society the effect of the addition of an alkaline nate (Bicarb Potass) to muriates of morphia and narcotine, in solution taric acid; showing the precipitate in both cases, the addition of any re-dissolving that from morphia, but having no effect on that from ne, though a large excess was added.

connexion with this subject it may be mentioned Gerhardt further p. 37, that neutral tartrate of morphia does not precipitate either stic alkalies or their carbonates. "La solution aqueuse n'est precipitée es alcalis caustiques ni par les carbonates alcalins." I have not, how- en able to find any difference in its behaviour with either caustic alkalies carbonates from that of other salts of morphia. It is precipitated in the same way as the muriate or any other salt of morphia.

SALE OF POISONS.

usiness announced for the evening having terminated, the **Chairman**, the few minutes that remained, took the opportunity of adverting to the ion of accidents by poison, and the order of the Dublin College of ans to use angular bottles and pots for external applications, and round for medicines intended for internal administration. He considered any ion of that nature which could not be invariably observed, worse than because the rule being relied on, each exceptional case would be a fresh of danger. The term angular conveyed no definite idea as to the form es or pots, and a large proportion of the bottles in common use for all s, although differing from each other, came within the definition of bottles. It would be impossible to establish on a sudden a supply of of all the requisite sizes and shapes, and to enforce obedience to the y distinction; and whenever a bottle of the right size and shape was not l, the rule would be disregarded, and, if relied on by the patient, ts would occur in consequence. Again, the list of poisons enumerated Dublin College, comprised many in daily use as internal medicines, and s alarm would often be caused by the appearance of danger without a For example, if a servant having been sent to a chemist with a pre- n, reported that two or three of the ingredients had been taken out of bottles, the patient would naturally be afraid to take the medicine, as it e presumed that patients are to be taught the meaning of the distinction, se it would be useless. Even supposing the angular bottle precaution to cticable, it would not prevent a patient taking a poisonous dose of the edicine. Must every pennyworth of a poisonous substance be put in an r bottle? He (Mr. Bell) believed the most simple and safe precaution ed in labelling everything properly. He had adopted the plan of using ttles for external applications, but when these happened to be of unusual sizes, the rule could not always be observed, and it would not be safe to rely implicitly either on the colour or the shape of the bottle. A label with the word "poison," or "with care," "for external application," or "not to be taken," could at any time be used in addition to the label containing the direction; and this he believed to be the best precaution. He would be glad to hear the result of the experience of other Members present.

Mr. MACFARLANE inquired how many articles were included on the list of poisons issued by the Dublin College.

The CHAIRMAN, speaking from memory, said about thirty or forty,* besides preparations: he regretted that he had not brought the Supplement, the idea of introducing the subject having only occurred to him when he found there was a quarter of an hour to spare.

Mr. MACFARLANE said, that in addition to the objections stated by the Chairman, the use of angular bottles, even if it were strictly carried out, which he thought scarcely possible in practice, would not prevent the accidental substitution of one poison for another; for example, tincture of aconite for tincture of henbane or paregoric. He attached more importance to the label than to any other safeguard, and it should be a rule never to fill a bottle with any poison without pasting the label on previously. He mentioned a case he had recently heard of, where the surgeon of a regiment had received, among other medicines, some strychnia, and having two bottles for containing oxide of bismuth, he appropriated one of them for the strychnia, and, having put the strychnia into it, was proceeding to paste on the proper label, which he had carefully prepared, when he was suddenly called to attend a case of convulsions. During his short absence, one of his own prescriptions, containing oxide of bismuth, was brought to the hospital sergeant to be prepared. He unfortunately took the bottle containing the strychnia, which was still labelled bismuth, to prepare the powders, one of which was taken by the patient (a married lady). Violent symptoms immediately set in, and the lady died very speedily, declaring that she had been poisoned. The doctor was sent for, and conscious that there was nothing in his prescription which could have occasioned such a disaster, supposed death to have arisen from disease of the heart, and offered, for the satisfaction of the bereaved husband, to swallow one of the powders then and there. The gentleman said, "No, one human life is enough." It was agreed, however, that one should be given to a dog, which being done, the poor animal died in a few moments. Accidents occurred in so great a variety of ways, and mostly under circumstances for which the parties were so unprepared, that it would be impossible to provide against every casualty, and the most effectual check would be found in the general care and intelligence of the dispenser, and a scrupulous attention to distinct and proper labelling. Besides, while so much attention was given to liquids, what was to be done with powders and crystals—oxalic acid for example?

Dr. O'CONNOR stated that the Apothecaries' Company of Dublin had refused to comply with the order of the College, and had published a protest, declaring it to be an unjust innovation, besides being impracticable. He thought the most effectual security against accidents consisted in the improved education of the Pharmaceutical profession.

Mr. SQUIRE said he had for many years used green labels for external applications. He found the practice unattended with any trouble or inconvenience, and so far as his experience enabled him to judge, it appeared to answer the purpose. He agreed with those who had previously spoken, in considering the angular bottle scheme as visionary and impracticable.

The CHAIRMAN asked Mr. Squire whether he used green labels for distinction when a bottle of drops and a draught about the same size were ordered in a prescription?

Mr. SQUIRE said, in such cases he used a bottle with a glass stopper for the

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* Materia Medica, 33; Preparations, above 180.

In fact, he invariably used glass stoppers when the medicine was to be
by drops or teaspoonfuls.

Waugh thought the Dispensing Chemist had already quite enough
nsibility, without imposing more on himself. If he understood his busi-
and used all due care and skill in preparing the medicine, and labelling
thing distinctly, with directions how each article was to be used or taken,
this was enough in all conscience. He could not be expected to furnish
ply of common sense to his customers, or to supersede the necessity of their
their eyes. If patients would persist in swallowing lotions and liniments
out looking at the labels, angular bottles or green labels would not save
It was puerile to attempt to legislate for cases of that kind, or to throw
lame on the Chemist. Some responsibility must be left with the public;
f a man is bent upon suicide, and prefers doing it in a clean, scientific
er, instead of cutting his throat and making a mess on the carpet, such
s are greatly to be lamented, but no law can prevent their occurrence.
Mr. Waugh) protested against the injustice of trying to cast a slur upon
hemists. There might be here and there a blear-eyed boy, but, as a class,
lieved them to be very careful, hard-working, and ill-paid; and considering
many thousands of delicate manipulations they had to perform, he thought
t was due to them that the per-centage of accidents was so small. It was
notorious that when accidents did occur, in a large majority of cases they
ted from some culpable negligence or criminality on the part of the
mer in spite of the care and precautions of the Chemist. He objected equally
gular bottles and coloured labels, as being a futile attempt to relieve the
ic of the responsibility of using their senses.

Tustin said, that at the London Hospital it was the custom to use green
s for external applications. The precaution, however, was not effectual,
tients would occasionally swallow lotions in spite of the label.

Waugh said he was glad to find that the experience of those who had
coloured labels and bottles confirmed his views on the subject. It often
ened that medicine was given to patients in the night by nurses who were
asleep, and by the dim light of a sick room, the colour of the label would
mperfectly seen—in fact, it would be less conspicuous than an ordinary
l; for what could be more plain and legible than black and white, the
ing being clear and distinct, so that he that runs may read. It would be
for young men to pay more attention to their handwriting. He threw out this
as he had sometimes seen with regret very indifferent specimens of autography.

r. **Deane** said he had for some years used red labels for external applications.

r. **Copney** said that at St. Mary's Hospital they used labels of three colours
llow, green, and red—for lotions, liniments, and embrocations. It was an
ction to this plan that the ink was not so visible as on white paper, and the
nts did not appear to understand the distinction; consequently it was of
or no use.

r. **Tustin** thought the practice of labelling pill-boxes on the lid instead of
he box objectionable, as the lids occasionally were misplaced.

he **Chairman** mentioned a similar case in reference to covered pots. A
nt had a pot of mercurial ointment and one containing an electuary, both
me size. He transposed the lids, and after having taken two or three
s, he came back to the Chemist and complained that he really could not
any more of that medicine. It was found that he had been taking the
ment and rubbing in the electuary. The Chairman said the discussion
ch had taken place had tended to confirm his impression that the most effectual
caution against accidents consisted in a careful attention to the labels.
thing should be sent out, either in paper or in a bottle, without a label; and,
he case of lotions or dangerous external applications, the caution label should
at the bottom of the bottle, separate from the ordinary label of directions.

The discussion having extended half an hour beyond the usual time, the
airman adjourned the meeting until Wednesday, the 7th of January.

PHYTOLOGICAL CLUB.

17, Bloomsbury Square, November 12th, 1856.

DANIEL HANBURY, F.L.S. IN THE CHAIR.

A work entitled *Histoire Naturelle du Cocotier*, par M. C. Regnaud, was announced as a donation from the author.

Mr. Hanbury laid on the table a specimen of *Vincetoxicum nigrum* (Asclepiadaceæ), also a specimen of the pods of *Ceratonia siliqua*, or St. John's bread, which have been lately imported from Portugal, and used as food for cattle.

Mr. Hanbury also exhibited a sample of Indian galls called Myrobalan *Flowers*, recently imported into London, and referred to a figure and description of them in Guibourt's *Histoire des Drogues*.

Report was made that the botanical excursion to Dartford took place on the 21st of June. Upon leaving the railway station, the party proceeded to Darenth Wood, passing through which, in the direction of the village of Stone, they returned to Dartford. Among the more interesting plants collected, the following may be enumerated:—*Ajuga Chamæpitys*, Schreb.; *Onopordon Acanthium*, L.; *Centaurea Calcitrapa*, L.; *Galium cruciata*, Scop.; *G. tricorne*. With.; *Hippocrepis comosa*, L.; *Ornithopus perpusillus*, L.; *Trifolium subterraneum*, L.; *T. striatum*, L.; *Geranium lucidum*, L.; *Rhamnus catharticus*, L.; *Silene Italica*, Pers.; *Sisymbrium Sophia*, L.; *Papaver Argemone*, L.; *P. hybridum*, L.; and *Adonis autumnalis*, L.

A paper was then read by Mr. Grundy on "The Circulation of Sap," which elicited some discussion.

PHARMACEUTICAL SOCIETY,

NORTH BRITISH BRANCH.

The first meeting of the Pharmaceutical Society in Edinburgh, for session 1856-7 was held in the rooms, 72, Princes Street, on Thursday evening, 6th Nov., at nine o'clock,

MR. JAMES ROBERTSON, PRESIDENT, IN THE CHAIR.

Mr. Robertson delivered the following Address:—

"Gentlemen,—In commencing the duties of a new session, permit me at the outset to bespeak your kind indulgence in regard to myself as your President for this year. The aim and objects of this Society, the privileges and advantages arising therefrom, and the duties required as enjoying those benefits, have on former occasions been so clearly pointed out, that little more remains for me than to endeavour to follow the example of my predecessors; and I hope you will therefore bear with me, whilst I attempt to recapitulate some of those advantages, and urge upon you the duty of considering them really and truly as such, anxiously and diligently doing your utmost to profit by them. It is now upwards of fourteen years since the Pharmaceutical Society was first instituted in this country, and that, as you are aware, after much labour and perseverance on the part of those gentlemen who took a warm interest in its establishment. Many difficulties had to be contended with, and from first to last some of them were of such a nature, that had it not been for the almost unprecedented energies and labour of one individual, in all probability we should not have been here to-day; and I think that gentleman may fairly be considered the Father of the Pharmaceutical Society. Well, then gentlemen, you must bear in mind that those labours were cheerfully undertaken, and those difficulties met and overcome, for the express purpose of raising the status of the Chemist and Druggist in this country; and whilst I admit that each Member of the Society is called upon to aid this desirable object, yet I am of opinion that to the Junior Members must the Society look for its ultimate accomplishment. And surely I am right in maintaining that any calling which requires the man who engages in it to be a good general scholar, well acquainted with Materia Medica, Chemistry, Pharmacy, and Botany, ought to possess fully as much the character of a profession as of a trade. And as young men must pass the examination laid down by the rules of this Society, and show that they have acquired such a knowledge as I have just mentioned, before they are admitted as Members, a guarantee is thereby afforded to the medical profession and the public, that a Pharmaceutical Chemist is entitled to their confidence and respect. And allow me, my young friends, to ss it strongly on your minds that this desirable position ought to be your st object and aim. Now let me shortly endeavour to point out to you—and I especially address myself to the Junior Members—how this is to be done. then, gentlemen, presuming that your general education has been well ded to, I shall begin with your apprenticeship. This, I doubt not, all of you be ready to say is an up-hill period. And so it is. Nevertheless it is a most rtant period of your labours, and upon its right improvement, much, very of your future prospects and success in life depends. You must endeavour to re active and tidy habits, great accuracy in whatever you have to do, and ugh some work may seem useless and disagreeable at first, persevere ; and if tudy your master's interest, depend upon it you will eventually secure your For that identification of your own interest with that of your master will not enable you cheerfully to surmount difficulties, but beget a stronger desire to re such a knowledge of your business as cannot fail to aid you greatly in your studies ; thereby qualifying you for occupying a permanent and responsible in your profession. I would also beg to remind you that in addition to the iety of refreshing your minds from time to time with your school-boy studies, ught to read daily a portion of some work on Materia Medica, Chemistry, or y ; and I would strongly urge upon you to be very zealous in acquiring a ledge of the properties and doses of the various articles in the Pharmacopœia, h will the better enable you to avoid and detect errors in dispensing. To nplish this, need I say you must be diligent and anxious to avail yourselves of our leisure time ; for I well know that with most of you it is limited. Still, n may be done with a determined will. We have now a tolerably good museum ugs and chemicals, and a good library, considering the short time the Society ad the power of forming one ; and I have no doubt they will be happy, so far them lies, to add any work not yet in the collection that may be brought r their notice. I have also to remind you that our excellent friend, Dr. dam, intends resuming his 'Winter Course of Fifty Lectures on Chemistry onday, 10th inst., at a quarter-past nine o'clock, to be continued on Mondays Thursdays during the six winter months.' I have great pleasure in making announcement, as I have always considered those lectures to be of the greatest , not only to apprentices, but to those assistants who may not have had at an r period the advantage of such instruction. I trust, therefore, that one and all ou will be too much alive to his own interest to neglect embracing such an rtunity. The various branches of study I have just endeavoured to bring r your favourable consideration, are, I assure you, very necessary ; and let me urge upon all of you the necessity and paramount importance of being ous and careful in dispensing. Unfortunately too many fatal instances have red of late to convince every one of this, and let us hope that the Legislature ere long see the propriety of conferring such powers on the Pharmaceutical ty as were at first requested by its founders; and this more perfect measure, ined with the efforts now being made to raise the standard of qualification, t fail in process of time to prove of great value to the public at large, as it will by secure for them the services of Pharmaceutists, on whose accuracy and ledge of their business every confidence may be placed.

would only, in conclusion, remark, that you have with great truth been ently reminded from this Chair that your opportunities for acquiring a tific knowledge of your profession are very much greater than those in former ; and let us hope that the fruit of those advantages may not only be the sition of a larger amount of practical and scientific knowledge, a higher ciation of your position and responsibilities as Pharmaceutists, but that they also produce a spirit of liberality towards each other, such as ought always to te the minds of men following a liberal, scientific, and laborious calling."

. Stevenson Macadam gave a lecture on Plants as Manufacturing Agents, h was listened to with much attention, and frequently applauded.

veral interesting specimens were on the table, but especial reference was made very handsome donation by the Messrs. Smith, consisting of a tastefully made case, containing a magnificent specimen of Caffeine, and two specimens of ne. The thanks of the meeting were unanimously voted to Messrs. T. and H. h for this contribution to the Museum of the Society.

Intimation was then given of the arrangements made to facilitate the operations of the Library during the winter, and a desire expressed that more constant use be made of the various volumes now in possession of the Society.

A vote of thanks to the Chairman, by Mr. Baildon, terminated the meeting.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Thursday, 23rd October, 1856.

THE PRESIDENT, MR. ABRAHAM, IN THE CHAIR.

Messrs. Joseph Gill, Geo. Scholefield, Thos. Sherlock, Thos. Lowe, Geo. Fairban, W. J. Foulkes, T. W. Simcock, Jas. Carter, Geo. Batey, Wm. Tassell, and John Green were elected Members of the Society.

The Secretary announced donations to the Library and Museum from Messrs. H. S. Evans, N. Samuelson, W. H. Hawkins, L. Hardman, R. Clay, and N. Mercer.

Mr. Mercer exhibited a number of surgical and chemical articles, manufactured from "Vulcanite," a new non-elastic caoutchouc compound.

Dr. Edwards delivered a lecture on "Voltaic Electricity," well illustrated with experiments.

Thursday, 6*th November*, 1856.

THE PRESIDENT, MR. ABRAHAM, IN THE CHAIR.

Messrs. W. Harris, J. C. Reeves, G. D. Banks, E. M. Sheldon, Joseph Walker, and Wm. Fearnall were elected Members of the Society.

The Secretary announced donations to the Library and Museum from Messrs. Bailey and Wills, Wolverhampton; Carson and Kilgour, E. Howell, and the Literary and Philosophical Society.

J. A. Forrest, Esq., delivered a most interesting lecture on "Glass Staining," with especial reference to the chemistry of the process. The lecture was illustrated with a large and well-selected series of specimens, showing the different styles of glass-staining from the earliest period to the present day, and explanatory of the processes at present employed.

The thanks of the meeting were accorded to Mr. Forrest for his instructive lecture, and also to the donors to the Library and Museum.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The first Meeting for the session was held in the Royal Institution, Mosley Street, on Thursday, November 6,

MR. LYNCH, PRESIDENT IN THE CHAIR,

who commenced the business of the evening by congratulating the Members on having, through the kindness of the Council of the Royal Institution, obtained such a comfortable and convenient room for their meetings, which he trusted would be more numerously attended than in the previous session. It was much to be regretted, that both the principals and assistants showed such an apathetic spirit, and that the latter, especially, should be so slow to avail themselves of the opportunities afforded; but he hoped that, with the assistance and active co-operation of the Members, the objects of the Society would be more fully carried out, and that each year would bring an accession of new Members.

It was intended to present the prizes to the successful candidates in Chemistry and Botany, but the Lecturers being unavoidably prevented from attending by previous engagements, it was thought desirable to postpone the presentation until the next meeting, when they might, probably, be able to attend.

Mr. Standring, after adverting to the benefit which the society might expect to derive from its connexion with the Royal Institution, moved, "That the thanks of the Members of the Association be given to the Council of the Royal Institution for their kindness and liberality in allowing them the use of a room in which to hold their meetings."

Which, being seconded by Mr. W. S. Brown, was carried unanimously, and the Secretary was directed to communicate the same to the Council.

The Meeting was indebted to Mr. Woolley for some curious and interesting specimens of natural and artificial products, amongst which, a remarkably pure specimen of native cinnabar, from California, and one of native oxide of lead, from Central America, were especially noticed, and a bottle containing a large quantity of the crystalline substance which is deposited in the manufacture of oil of vitriol, when a sufficient quantity of water is not introduced into the chambers, and is sometimes called anhydrous sulphuric acid. Its composition is variously stated, but it appears to be a compound of SO_3 with NO_2, and perhaps HO.

A specimen of Cistus Creticus, from which Labdanum, or Ladanum, is procured, together with some interesting pharmaceutical preparations from Messrs. Hearon, M'Culloch, and Squire, were shown by Mr. Lynch, amongst which true English oil of wormwood, fixed oil obtained from cubebs, and fixed oil from nux vomica, attracted much attention as articles rarely to be seen, and ext. papav. and ext. sarsæ, consisting only of that portion of the ordinary extract that is soluble in alcohol, were noticed as examples of a process which, if generally adopted in the preparation of vegetable extracts, would probably produce greater uniformity in their strength, by freeing them from inert matter.

ORIGINAL AND EXTRACTED ARTICLES.

ONE THING FORGOTTEN.

The *Times* is a great paper. It glorifies all it touches. One allusion in its columns is sufficient to invest any subject, however previously obscure, with sudden interest.

The British nation has been annually poisoned. Druggists have mistaken recipes, customers had wrong physic, and apprentices from time to time administered Black Drops; but the fatal occurrence has created only a local and temporary sensation. There is a coroner's inquest and a reported trial, so the matter ends. Meanwhile a Society, called the Pharmaceutical, has constantly urged two facts, and urged them, Cassandra-like, unheeded: the one is, the total impossibility of expecting a high standard of either Theory or Practice in an establishment which is not half so much a Pharmacy as a Marine Store, since no official status can ever give *that mind* a status which is content to devote its equal energies to Grocery and Physic, and with sublime equanimity furnishes funerals and sells honey; the other is, that the fruitful source of accidental poisoning is the incompetence of the Dispenser, that that incompetence proceeds from ignorance, and that the mist of such ignorance can only be dispelled by the breath of an Examination. The *Times* has lately pronounced the same oration, and surely no reasonable man can have anything to bring forward to the contrary. Nevertheless, clear as the prospect seems, one thing has been forgotten; one grave consideration has to be grappled with before we can advance a step.

It has been stated by the Society from its commencement, and the assertion is now re-echoed by the general Press, that the great national safeguard is Education.

The world is tremblingly alive to the advantage of entrusting itself to the care of competent and experienced men. The Physician is equally aware that he must seek for accurate dispensing at the hands of those who owe their position not to their advertisements, but their studies; while the self-interest of the Chemist tells him that only by acquaintance with the abstract can he venture successfully on the practical. Why then with a duty so undeniable, the vital importance of which none can gainsay, does not every English Druggist qualify himself for his position? why is a principle of honour not sufficiently strong to induce him so to do? and why will no other motive short of a compulsory Examination, nerve him to the attempt?

Because, under the present constitution and framework of a Chemist and Druggist's business, it is an impossibility. The Assistant *has not got the necessary time;* and in all these elegant panegyrics on Education, this is the one thing forgotten.

Look at London, with its multitude of streets and houses; its waving, restless, innumerable crowd, surging up and down. In the midst of the busy scene, the coloured lights of oft-recurring Pharmacies arrest the attention of the passer-by, like signals in distress; now bathing him in the roseate hue of sunset, now tinting him with a pale-green sickly glare. Within those establishments are transacted the affairs of life and death: a right direction on a label, an accurate hand, a genuine drug, give life; a wrong direction, an inaccurate hand, a vitiated drug, may possibly cause death. Take a view inside. There two or three assistants (not generally the master) are busily engaged. Shall it be supposed that the importance of their avocations is known to all the world, but not to them? that their aspirations never rise beyond the counter? that to them *only* it is a matter of indifference whether they are or are not acquainted with chemical manipulations? that they have no interest higher than their salaries, and that by some strange influence, neither a feeling of personal risk, nor yet that of personal honour, stimulate them to acquire a knowledge which to them is indispensable? No! they are perfectly capable of appreciating the good set before them, but are outlawed from its possession. An insuperable barrier frowns between it and them—they have no time.

In this view the question of money has been intentionally omitted, for, had it been hinted that the scanty allowance which falls to the ordinary lot of an Assistant has something to do with limiting his views, and that neither his present nor his future prospects are of that inspiring order which his parents fondly imagined, a host of angry remonstrances would have ushered in the new year, and Nemo, Veritas, Fiat Justitia, an Injured Saxon, and various other curious gentlemen, would have risen up indignant.

Look once more at London—every man is occupied—all seem hastening after their own pursuits. Perhaps there is no place in the world where competition is keener, or anxiety to succeed is more intense. How the number of Chemists' shops are supported is an enigma—a problem which, when personal, is complicated with a fearful import. One thing is certain, success waits on the wheels of knowledge. Every particle a man knows more than his neighbour, is a stepping-stone to fortune. Pharmacy is a business in which the minutest detail of pure Chemistry can be used to advantage. Science here is the true utilitarian. The art of analysis, the skill of manufacture, the right use of steam, the choice of drugs, the medical value of herbs, the action and reaction of organic and inorganic substances, are not only alluring objects of research, but prove a direct economy of labour, as well as a satisfactory source of profit.

Does not the Assistant know this? Does he not, when he gazes painfully at his Thirty annual pounds, ponder these things? Are we to suppose that his calling has on him such a narrowing influence that it annihilates even his self-interest? and is a mission necessary to preach to him the glad tidings that there is in knowledge a power which will give him a position, pay his debts, and create a name? He knows it as well as William Allen did, but he has not got the time.

Yes! and so deeply is this felt—so strong is the natural impulse to vanquish circumstances, that even under this external pressure, some have presented themselves for examination and passed more than respectably, just as the student will recollect Napoleon made a high road through the Alps, though such an undertaking was not usual.

Others, under happier influence than a London situation, have availed themselves of the generosity of the Council, and vindicated the character of an Assistant, but there yet remains a great class of Chemists, the most industrious, the most deserving, and unquestionably the best skilled in practical business Pharmacy, the length of whose duties shuts them out for ever from *official* reputation.

They are soldiers who fight hard and are never decorated! But before they are abandoned to an ignoble fate, let one short word of apology be heard in their defence.

There is nothing unpleasant in an evening meeting—subjects are discussed, people are brought together—there is tea and coffee, and as much gas as would light the Hall of Commerce. Some attraction is afforded by social intercourse; there is a pleasure in mutual interchange of sentiment, in good débate, in new discoveries; and when the hours of business are reasonably curtailed, the small lecture-room in Bloomsbury Square will not be able to represent the English estimation of self-improvement.

Well! suppose a solitary Assistant has crept out of his conservatory, and listens for the first time to a discourse on the great importance and elevating influence of Education. He is told to study, and he says to himself, when? to acquaint himself "with Chemistry, Pharmacy, Materia Medica, and Botany, including the practical manipulations of the laboratory and the dispensing counter, the modes of ascertaining the strength and purity of drugs, the tests and antidotes for poisons, the doses of ordinary medicines, and an acquaintance with prescriptions," and he says to himself, how? Hope kindles as he hears the last paragraph, and dies away when he recalls the first. He is told also, that after having accomplished that which is utterly and hopelessly beyond his reach, he is to go home and have a "status." Delightful prospect! Poor friendless mortal! he leaves the Hall of Science, and regaining his original hot-house, finds there £30, and work from seven to twelve o'clock. Such an Assistant (and they are not like our modern companies, "Limited") is neither to be blamed for ignorance nor accused of apathy. A man may be pardoned a little indifference, whose despair is only equalled by his disgust.

We should not be too hard upon the "blear-eyed boy" who is working up a suspicious pill, to the dismay of a popular journal; if his hours were shorter, his eyes would probably be better; more than some trifling indulgence should be shown towards those whose protracted occupations indispose them to serious study, and drive them instinctively to lighter recreations. So long as an imperious and exacting public demands the Druggist's services from morn to midnight, so long will it have to weep over adulterated drugs, and may expect to be poisoned, for the last lingering chance of education is snatched from the Assistant's grasp. Give him fair play—set him at liberty before his wasted energies are exhausted, and we shall hear no more of his deficiencies.

31, Southampton Street, Covent Garden. JOSEPH INCE.

ON THE POSITION OF SODIUM IN THE THERMO-ELECTRIC SCALE.

BY G. GORE, ESQ.

If we take a piece of glass tube six inches long and half an inch in diameter and bend it at right angles at about the middle of its length, leaving the ends open, then place a small rod of metallic sodium, about two inches long and a quarter of an inch thick, in one arm close to the bend, and cover it with mineral naphtha, force one end of each of two sharp-pointed stout copper wires a short distance into the ends of the bar beneath the liquid, connecting their outer and free ends with a galvanometer at a distance of twelve or twenty inches from the tube, and carefully apply heat by means of a very small flame of a spirit lamp to the part of the tube at the upper end of the bar of sodium, a current of electricity will be generated passing from the heated junction of copper and sodium through the bar of the latter metal and onwards through the other copper wire and galvanometric circuit, proving by its direction that metallic sodium is thermo-electro-positive to copper, and determining sodium as belonging to the class of thermo-electro-positive metals.

I have in the above manner examined the thermo-electric relations of sodium to the following metals and metallic alloys: German-silver, platinum, palladium, aluminium, tin, lead, brass, copper, and silver; and have found it thermo-electro-positive to silver, copper, brass, lead, tin, and aluminium; feebly thermo-electro-negative to palladium, platinum, and more strongly so to German-silver.

In a former number of this Journal (May, 1856), "On the position of Aluminium in the Thermo-electric Scale," I determined the position of aluminium in the scale as being next below (or a little less thermo-positive than) tin; but having since obtained a much larger piece of that metal, I have been enabled to determine it more correctly, and have found it to be next above (*i. e.* a little *more* thermo-positive than) tin in the series, a result which I perceive has also been obtained by Professor W. Thomson, and recorded in the Report of the British Association for 1855.

If we now take the thermo-electric series of metals, &c., as arranged by Cumming, and include sodium and aluminium, the following will be their order:

Thermo-electric Scale of Metals, &c., including Sodium and Aluminium.

Galena
Bismuth
{ Mercury
{ Nickel
Platinum
Palladium
Sodium
{ Cobalt
{ Manganese
Aluminium
Tin
Lead
Brass
Rhodium
Gold
Copper
Silver

Zinc
Cadmium
{ Charcoal
{ Graphite
Iron
Arsenic
Antimony

The position of sodium and aluminium to cobalt and manganese I have been unable to examine, not possessing suitable pieces of those metals.

Birmingham.

THE NEW STYPTIC, PENGHAWAR DJAMBI.

BY MR. T. C. ARCHER.

In the last number of the *Pharmaceutical Journal* there was an exceedingly interesting article by my talented friend, Mr. Daniel Hanbury, upon this curious production. Mr. Hanbury argued quite correctly that the Penghawar is the produce of a species of Cibotium, and the corroborative evidence of so excellent an authority as Mr. Jno. Smith, whose enumeration of ferns is now one of the best works of reference, is very valuable.

But I am inclined to differ somewhat from the conclusions at which Mr. Hanbury has arrived. This substance has been known to me for at least twelve years. A small importation of it reached Liverpool under the name of *Pulu*, which was said to have been brought from Owhyhee, and a small sample of that importation was sent to me under the name of "Pulu, or Vegetable Silk," a kind of thistle-down, with the information that it was intended to be used, mixed with silk, in the manufacture of hats. I never heard how it succeeded, or whether it was really employed for that purpose. The specimen sent to me was placed in the Collection of Liverpool Imports which I formed for the Great Exhibition of 1851.

I thought at that time it really was the pappus from some composite seed; but in 1852 my attention was called to some beautiful stems of *tree ferns*, which were landed at this port, some of which had portions of the stipes attached; and these were covered by the very beautiful Pulu, which I instantly recognized. These tree-ferns were from some of the Pacific Islands, but I do not remember which.

Since the commencement of the present year I have been engaged in forming a new branch to the extensive museum of the Liverpool Royal Institution, for the purpose of illustrating the products of the animal, vegetable, and mineral kingdoms, and their applications, under the name of "The Museum of Applied Science," and amongst the numerous contributors who have generously and most liberally assisted me in this important undertaking, one of the foremost was Lady Dorothy Nevill, of Dangstein, near Petersfield, Hampshire, whose ardent pursuit, and liberal patronage of botanical science, are the admiration of all who have the honour of her ladyship's acquaintance.

Amongst the numerous contributions of Lady D. Nevill to our Liverpool Museum, was a fine specimen of the Pulu, which I believe to be identical with Penghawar (I send a specimen herewith). Lady Nevill informs me that this beautiful material was removed from the stipes of a fine fern, bought of the Horticultural Society, under the name of *Cibotium Schiedianum*, which, I presume, is the same as the *C. Schiedei* of Schlect and Chamisso. I do not think it improbable that other species may produce these curious monilliform hairs; but they so little resemble the hairs of *C. Barometz*, on the few specimens which I have had the opportunity of seeing, that I cannot refer the Penghawar to it, and, consequently, not to *C. Cumingii*, if, as Mr. John Smith says, they are the same species.

I am sure Mr. Daniel Hanbury will not be displeased that I have so slightly differed from him, for he must, and, I am certain, does, appreciate the value of these discussions in the *Pharmaceutical Journal*, which have been of such real service to science, and contribute to sustain the character which the *Journal* has so justly earned, as the organ of the really intellectual portion of the large body of Practitioners in Pharmacy.

EFFECTS OF THE PRESENCE OF SULPHUR IN COAL GAS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I find it somewhat difficult to answer Mr. Lewis Thompson's letter in your last number without going "beyond the record," since there has appeared so much correspondence on the subject since that was written, that the matter has assumed a different aspect. I do not think it may prove altogether unprofitable, however, to dwell a little on the subject, since the quality of "the Gas we Burn" is a public question, in which almost all your readers are personally interested. It may also incidentally subserve some other useful ends, as, for example, to illustrate the fate of the scientific man who, to point out an abuse, goes a little out of his way, and consequently, like the traveller "from Jerusalem to Jericho, falls among"—monopolists!

It will be remembered that I published in the September number of this Journal (page 166) a partial analysis of an efflorescence that formed on a copper boiler, set over a gas-flame, wherein its composition was shown to be that of pentahydrated sulphate of copper. At the time, it was deemed scarcely worth while to determine experimentally the exact amount of the large quantity of water it was found to contain, and which obviously made up the 100 parts, less various trifling impurities, to the amount of perhaps one per cent. Had I at all anticipated that this modest analysis would have been elevated into a sort of moral Troy, by contending factions, I should have made every atom of even extraneous matters in the substance pass the ordeal of the balance. This omission once made was not easily remedied, since the deposit which had been long accumulating was swept away; and I cannot yet collect an adequate quantity for a satisfactory analysis, in a sufficiently pure and unmixed state. When that comes to pass, I should be most happy (under suitable conditions) to furnish Mr. Thompson or the Gas Company with a sample for the analysis of any competent and disinterested Chemist as umpire.

Immediately after my notice appeared in your pages, it was reprinted, and made the subject of a leading article in one of the Bristol papers. The Gas Directors incontinently employed Mr. Thompson to reply in long epistles, which (duly paid for as advertisements in the local papers) endeavoured to wash them white; but, alas! the harder he scrubbed, the dingier seemed his clients to become! He insinuated that the analysis was not a genuine one, since it was "incredible" that the substance should not contain *ammonia*. Now I had not originally sought for ammonia at all, well knowing that no more than mere traces could possibly be present; but on reading his remarks, I examined the product anew, and finding some ammonia, scraped up sufficient to determine its amount with precision.

22.07 grains of the efflorescence were introduced into a capacious retort, and boiled for an hour with a large excess of caustic potass, the neck of the retort being set sloping upward, that no drops of the alkaline liquid might be carried over. The steam and ammonia were condensed in dilute hydrochloric acid, in a "Ure's" five-bulb-apparatus kept cool. The liquid was evaporated to dryness with bichloride of platinum, and the resulting ammonio-bichloride washed with ether-alcohol. It weighed 1.655 grains, equivalent to .449 *per cent.* of ammonia (NH_3).

This fact candidly stated, Mr. Thompson cries, with a vivacity almost feminine, "There, you *did* find ammonia; therefore your numbers for the oxide of copper and sulphuric acid must be altogether wrong!"—nay more, he plainly asserted that the analysis had never been performed at all—that it was a sham—a mockery and a delusion which he entreated me to disavow. "Dr. Griffin finds something 'green' on his boiler, and presuming it to be sulphate of copper, quietly copies a modified formula of that substance." I then pointed out that the only cupreous compound of ammonia that could be present was the ammonio-sulphate (NH_3, $CuO+NH_4O$, SO_3), since the loose pendant flocculi of the efflorescence, projecting within half an inch of the flame, are never far below a red heat, and indeed I have often seen them intermittingly red hot. Such a temperature would drive off the ammonia from any of its known compounds with oxide of copper, and any small quantity that the deposit was found to contain must have been subsequently absorbed (together with the *water*) after the anhydrous sulphate had fallen from the boiler. The following table will put in a clearer light the per-centage composition of these various compounds. The corroboration of all my statements respecting them will be found in Gmelin's *Handbook of Chemistry*, Cav. Soc., vol. v., pp. 425 *et seq.*:—

	Ammonio-sulphate of Copper.		Hydrated Sulphate of Copper.	Efflorescence.
Oxide of Copper ...	32.65	32.52	32.0	32.085
Sulphuric Acid	32.65	32.52	32.0	31.809
Ammonia	34.70	27.64	......	.449
Water..................	......	7.32	36.0	(not determined)
	100.00	100.00	100.0	

Thus fell to the ground Mr. Thompson's *brace* of malignant insinuations against my scientific honesty: the *first*, that I could not fairly have performed the analysis, because I did not find ammonia; the *second*, that having subsequently found less than half a per cent. of that alkali, the numbers I gave for the acid and oxide of copper must have been totally erroneous! He now coolly turns round, and, with consummate effrontery, pretends (*Journal of Gas Lighting*, Nov. 11) that I had professed to find my efflorescence an *ammonio*-sulphate, containing 27½ per cent. of ammonia; and that I could never have really performed the analysis, because that compound could not exist under the circumstances!! I knew that too well in the first instance to look for ammonia in the efflorescence, as it was no part of my then object to estimate traces of extraneous matters; but when Mr. Thompson continues that the ammonio-sulphate is decomposed even at the temperature of the air, he is as much at sea as usual; for at a heat of 300°, it still retains 17½ per cent. of ammonia, which is only fully expelled at 500°.

Mr. Thompson goes on to say, that the substance cannot either be the simple sulphate of copper, since Berzelius says that becomes anhydrous at 104° F., when it is *white*, whereas my efflorescence was *green*. In that single sentence are no less than two misquotations so glaring that they must be wilful. My paper says that the efflorescence is "greenish-white" (that is, white with a shade of green), as we should expect to find it; and so far from Berzelius stating that the sulphate of copper becomes anhydrous at 104° F., he distinctly says (*Traité*, iv., 159) that it then loses only two out of its five atoms of water. The remainder is not expelled below 460° (Graham). Now the anhydrous sulphate, exposed to moist air for three days, absorbs again the whole of the five atoms of water belonging to blue vitriol (Gmelin, v., 430). Hence it was not surprising that I found the deposit, which had lain on the slate beneath the boiler, not three days only, but as many months, to be fully hydrated. In the words of my original paper, "under the influence of air and moisture, it had passed into the state of hydrous sulphate." This latter still remained nearly white, which blue vitriol itself is in the finely divided state, even on mere grinding in a mortar.

Let us now briefly examine Mr. Thompson's own statements in your last number. He says that the ammonia given off from the flame will always neutralize into a harmless salt the acid simultaneously evolved. But, as I have remarked elsewhere, "this will, if insisted on, place him between the horns of a fresh dilemma. The proportion of sulphur in the gas and of acid fumes produced in consequence is continually varying with the nature of the coal employed; not so, however, the ammonia, which is in fixed quantity, varying only according to the method of purification adopted in each particular works. Hence, if the ammonia present would just neutralize the smallest amount of sulphuric acid, it would be insufficient for the purpose when the quantity increased, and we should then have the unmitigated effects of the *free* acid; or, on the other hand, if the quantity of ammonia be always sufficiently great to neutralize the largest amount of acid producible, it must generally be in *great excess*, and ammonia is nearly as corrosive to metals and injurious to delicate colours as sulphuric acid fumes themselves. Mr. Thompson may choose whichever *horn* he deems to afford the least objectionable seat, but one or the other, by his own showing, is inevitable." Now, Dr. Letheby has closely investigated this matter, and in the able report "On Gas Supply" presented to the Commissioners of Sewers of the City of London in May, 1854, he gives us the following quantitative results of his analyses, which we may safely adopt as impartial and trustworthy. The following table shows the amount in grains of the ammonia contained at the time in 100 cubic feet of each of the varieties of gas named, with the quantity of anhydrous sulphuric acid that the combustion of the same quantity would furnish. I have added an additional column, to show how much ammonia *ought* to be present to neutralize that acid, as Mr. Thompson pretends is the case :—

100 Cubic Feet of	Anhydrous Sulphuric Acid produced.	Ammonia required to neutralize it.	Ammonia present.
City Cannel Gas	8.7	3.7	1.0
Chartered (Curtain Road).	11.8	5.0	3.8
Great Central	12.4	5.3	.5
City Company	13.1	5.6	.9
Chartered (Brick Lane) ...	13.6	5.8	1.8
Commercial Company	13.9	5.9	.8

Thus, striking out the second sample (where there must have been something wrong with the purification, as the stop-cocks and brass fittings would speedily testify), we find in no one instance sufficient ammonia present in the gas to neutralize *one-third* of the acid thrown off from the flame, and more generally not *one-eighth* or *one-tenth* of the amount, the rest of the acid still remaining *unmitigated vitriol*. But that is not all. Ammonia is decomposed by a red heat; it is, therefore, highly improbable that any appreciable portion of even the small amount in the gas itself should pass unaltered through an intensely hot flame, which thus practically evolves sulphuric acid alone. Dr. Letheby, in the report cited above, gives many interesting examples of the destruction of furniture, books, and even gutta percha, by the emanations from the flame of coal gas, but the length to which this letter has extended precludes me from referring to more that one or two instances. Dr. Christison, the eminent toxicologist, confirms the well-known fact that plants, and even cut flowers, speedily wither and die in a room in which gas is burnt; and the librarian of the Newcastle Philosophical Society relates that a volume which had been missing from the library for thirty-six years was quite sound in the binding when recovered, whilst others, bound in the same leather, which had been only a few years on the shelves exposed to the fumes of gas, had had their backs so rotted that the leather "could be easily brushed off them with a hard brush." I need hardly revert to the positive manner in which the eminent chemists Faraday, Brande, Aikin, and Prout traced the similar destruction of bindings in the library of the Athenæum Club to the same cause, as that is now a matter of chemical history. Water simply exposed for some time to the air of the Club drawing-room, lighted with gas, absorbed sufficient *free* sulphuric acid to redden litmus-paper; and Dr. Letheby has examined the water that condensed in the reservoir of the ventilating apparatus since attached to the gas-burners there at the suggestion of Professor Faraday. He found this to contain $1\frac{1}{4}$ oz. of sulphate of copper in the pint, derived from the action of the acid evolved by the flame on the copper pipes; and in this liquid, as in a variety of similar cupreous liquids and deposits produced by the combustion of gas, he, like myself, has never found more than "*mere traces*" of ammonia.

Now, as Mr. Thompson states that our Bristol gas is "as free from sulphur as the common coal gas of London," it may be well to ascertain what sort of quality he himself assigns to that. According to Dr. Letheby, he has asserted that it seldom contains less than a thousandth part of its bulk of the vapour of bisulphide of carbon. The combustion of 1,000 cubic feet of such gas would throw off into the air of our shop or room more than *half a pound of the most concentrated oil of vitriol*—an agreeable assurance truly! But the fact is, he has grossly overstated the case against himself and clients, or coal gas would, ere now, have been almost discarded from in-door consumption. Dr. Letheby assigns little more than one-twentieth part as much sulphur to ordinary gas; yet even that is sufficient in the long run to discolour every sort of fabric, rust metals, rot gutta-percha, and reduce leather (as on books) to "a scarcely coherent powder, with a powerful acid taste!" In the face of such a mass of concurrent and irrefragable testimony, the editor of *The Journal of Gas Lighting* (Sept. 16), coolly asserts "that sulphuric acid can never be produced by the combustion of coal gas, no matter what quantity of sulphur it may contain or in what form;" that Dr. Letheby obtained it "by the cata*lyc*tic (*sic*) action of spongy platinum, as prussic acid may be produced from mutton chops" (he in reality consumed the gas at a common burner, and generally condensed the products in *glass* vessels), and that "my copper boiler evidently replaced Dr. Letheby's ball of spongy platinum as a catalyctic agent." These editorial remarks are, however, comparatively temperate in tone, and deal only in errors of moderate proportions.

Mr. Thompson writes that the sulphur can be removed from gas "easily enough." He doubtless alludes to his own experiments, from which he has stated, that by passing the gas over ignited lime, he destroyed all the bisulphide of carbon "without injury to the illuminating power." If this statement be really true, we may indignantly ask of gas companies dividing a dividend of ten per cent., with a large surplus beyond (like ours at Bristol), wherefore they cannot bring themselves to incur a trifling extra expense to furnish a product which (however inferior in some respects) would at least not destroy our goods and furniture. Mr. Thompson's own statements furnish, however, a partial response to the query, for he says the gas becomes quite *inodorous* by his treatment showing that the naphtha vapours (the main source of the illuminative power) are completely decomposed thereby. As to the risk of accident from the escape of such desulphurized gas, a very slight subsequent naphthalizing would impart sufficient smell to obviate any danger.

Nor yet, even apart from the sulphurous contamination, is common gas well adapted for in-door use. The French are aware of this, and I have observed that almost all the fancy shops in Paris are lighted with moderator lamps. Its evils are, the intolerable heat and large amount of moisture and vitiating carbonic acid it produces in proportion to the light. All these drawbacks arise from its bad quality. The valueless hydrogen and carbonic acid gases, and the almost valueless subcarburetted hydrogen it contains, throw off nearly as much heat, carbonic acid and water from their combustion as the olefiant gas and hydrocarbon vapours which alone furnish the light. Even the moisture is not trivial either in amount or obnoxiousness. Forty argands will evolve, at the lowest computation, two gallons of water per hour; hence, in a November evening, many large shops, filled with delicate goods, will have the steam of *eight to ten gallons* of water thrown into their atmosphere, to condense on any cool surface, as we often see it in winter, trickling down the windows. The deterioration in quality mainly arises from pushing the distillation of the coal too far; squeezing out, so to speak, the last traces of its gas; the product after the seventh or eighth hour being almost non-illuminative. The consumer suffers doubly in consequence; first, by "the inflammation of his (yearly) bills," since, to obtain the required light, he must burn so much more of the gas than would otherwise be necessary; and secondly, from the destructive effects to health and property entailed by the exaggerated amount of moisture and carbonic acid produced in consequence. The present gas supply answers well enough for street lamps and other rough purposes, but it is extremely desirable that a highly illuminative and non-sulphurised gas should be supplied for the use of shops, offices, and private houses, in which latter its use would soon become almost universal. Though such gas would appear considerably dearer than the present at first sight, so much less would suffice, that the difference would not in reality be great, and would be amply compensated by the non-destruction of our goods and chattels.

One word more, and I have done with the subject. Notwithstanding the charge made against me, I must repeat that I have never entertained "any personal feelings or hostility" towards the Bristol Gas Directorate in this matter. I owe them neither grudge nor gratitude. I burn their gas (but solely in my laboratories) and pay their bills like other people. To treat, as Mr. Thompson does again and again, my saying that their supply (like that of many other companies) was not so good as it should be, in the light of an aspersion on the principles and moral characters of the Directors individually, is a pretence too absurd to need serious refutation. That the illuminating power of the gas has deteriorated since the reduction in price, is a matter of notoriety in Bristol, and has been repeatedly dwelt on in the newspapers; and I merely adduced a fact, which I observed incidentally, to show that the sulphur contamination kept pace with it. If Mr. Thompson has, as he says, "examined the gas of the Company at Bristol on several occasions within the last six years, both *before* and since the reduction in the price," he must have exhibited his usual amount of ingenuity, seeing that the reduction took place from the Midsummer of 1850, *more than six* years ago.

I am, Sir, your most obedient Servant,
FREDERICK W. GRIFFIN, Ph.D.

Bristol School of Chemistry, November 21, 1856.

REPORT OF THE
RESULTS OF PHYSICAL AND CHEMICAL INVESTIGATION,
AND OF THE
APPLICATIONS OF PHYSICS AND CHEMISTRY IN THE ARTS.

BY B. H. PAUL, Ph.D., F.C.S.

(*Continued from page* 223.)

Production of Iron.—Mr. Bessemer has obtained a series of patents for improvements in the production of iron. One of his methods is to subject melted crude iron to the action of currents of air. He purposes[*] to effect this by passing air through a tube into the metal, contained either in a ladle suspended upon axes, or upon the hearth of a reverberatory furnace, or in clay retorts similar to gas retorts, or in large crucibles. The iron is by this means to be decarbonized and refined to the extent required, and then cast into ingots or any other required form.

Another method consists in exposing the liquid metal, in a finely divided state, to the action of a rapid current of air. This is to be effected[†] either in a series of cupola furnaces, arranged at different levels, so that the metal may be run out of one into another through which air is blown against the falling shower of metal, or in a cylindrical or spherical furnace, mounted on horizontal axes, which are hollow, one serving to admit the blast pipe, the other for the introduction of fuel and the escape of the products of combustion. At the inside of the furnace there are shelves, which, when the furnace is made to rotate on its axis, serve to lift up the liquid metal, and let it fall again upon the fuel, so as to expose a large surface to the action of the blast.

It is also stated[‡] that by the same method cast-steel or malleable bar iron may be produced.

A third method is for the direct conversion of crude iron into malleable iron, without the use of fuel. This is to be effected[§] by forcing currents of air into liquid crude iron, contained in a suitable chamber.

The apparatus employed in several experiments that have been made, is represented by the annexed drawing.

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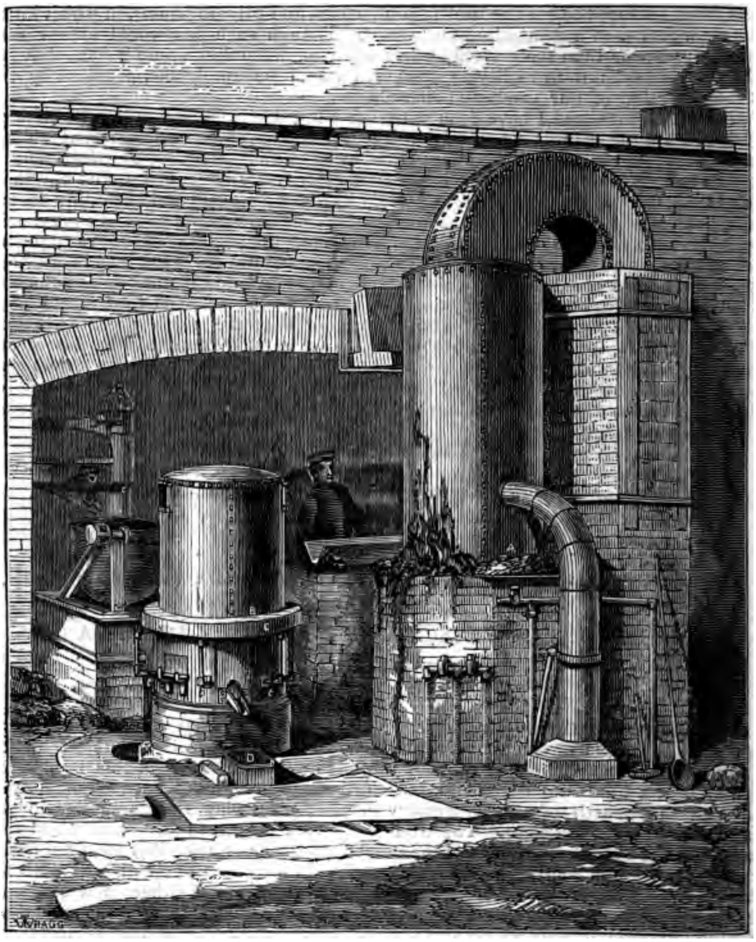
[*] Specification, No. 2768, 1855.

[†] Specification, No. 44, 1856.

[‡] Specification, No. 2321, 1855.

[§] Specification, No, 356, 1856.



A is the blast furnace for melting the metal; *B* the converting vessel with its tuyeres *t t*, supplied with air through the annular tube *E*. *D* is the ingot mould, sunk in the ground, for receiving the metal after the decarbonizing operation is completed; *C* a weighing machine for ascertaining the quantities of raw material and product.

The essential feature of this invention appears to consist in the decarbonization of iron, by forcing through it air, the oxygen of which combines with the carbon, producing such a great increase of temperature, that the metal remains liquid during the operation, and that even the decarbonized metal is melted, and may be run into ingots or cast in moulds.

Mr. Martien's patent,* which has been much spoken of in connexion with Mr. Bessemer's invention, is for purifying cast iron, not for producing malleable iron; and is not intended to supersede puddling, but merely to supersede the refinery operation. His method is to force currents of air or steam through the liquid metal as it flows along a gutter from the blast furnace into the pig bed.

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* Specification, No. 2082, 1855.

Mr. Martien has also obtained a patent[*] for the application, in the same manner, of various gases and oxygenous substances in the decarbonization and refining of iron. He purposes to remove sulphur by means of chlorine or hydrogen gas blown into the liquid metal as it flows from the blast furnace, or directly afterwards. Silicon is to be separated by means of finely powdered oxide of manganese or oxide of zinc blown into the liquid iron to the amount of about 3 per cent.

The decarbonization of the crude metal is to be effected by blowing into it 5 per cent. of spathose iron ore and 2 per cent. of clay.

MM. Janoyer and Gauthier[†] have found that the strength of iron, smelted with the hot blast, depends very much upon the amount of carbonate of lime used in the operation. Raw iron smelted with a charge that yielded a slag in which the proportion of lime and alumina to silica was B_7, A_{10}, had little strength, but broke readily, and analysis showed that it contained 3 per cent. silicon. The large amount of silicon in raw iron smelted with the hot blast has been ascribed to the easier reduction of silica at the high temperature thus produced. But by increasing the amount of carbonate of lime in the charge, so as to obtain a slag in which the proportion of bases to silica was B_8, A_{10}, and using a blast at the highest attainable temperature, the iron produced had much greater strength, and contained only 1.8 per cent. silicon. When the proportion of the bases and silica in the slag was B_{20}, A_{10}, the iron contained only an unappreciable trace of silicon, and the strength was increased in the proportion of 45 to 65. It would appear, therefore, that the inferior quality of iron smelted with the hot blast cannot be ascribed to the high temperature, but is owing rather to the charge not being suitably proportioned, and that when there is a sufficient amount of lime present silica is not reduced. When the maximum amount of lime was used, the consumption of fuel was on the average 6 per cent. greater.

Dr. Price and Mr. Nicholson have obtained a patent[‡] for a method of producing cast iron of great strength, fit for ordnance, girders, &c. It consists in melting together grey pig iron of good quality, and the metal produced by the refinery operation, in such proportions as will suitably reduce the per-centage of silicon. It is stated that by this means, iron having the character of charcoal iron, may be produced.

Mr. Sanderson has obtained a patent[§] for an improvement in refining iron. His method consists in mixing the melted pig iron with from 0.1 to 0.2 per cent. of sulphate or chloride of iron, or some combination of materials capable of evolving substances that will combine with carbon, silicon, aluminium, sulphur, phosphorus, arsenic, &c., and thereby facilitate the separation of such substances from the metal. The operation is conducted in an ordinary reverberatory furnace, and is continued for an hour. The chemical features of this process, as stated in the specification, are not altogether intelligible.

Captain Uchatius has obtained a patent[||] for a method of producing cast steel which appears to compete with Mr. Bessemer's in interest and importance. It consists in melting granulated pig iron with about 20 per cent. powdered iron spar, and 4 per cent. clay. The operation is conducted in crucibles, after the manner usually adopted for producing cast steel.

The essential feature of this invention is the direct conversion of pig iron into cast steel by the decarbonizing action of substances capable of evolving oxygen. The advantages of the method are, a considerable saving of fuel, labour, and raw material, inasmuch as the cast steel is produced by one operation from pig iron.

This method has been tried at the works of the Northern Railway in France, and was found to be stronger than ordinary cast steel in the proportion of ten to eight, and suitable for making axles. However, according to the report of M. Vissocq,[¶] the engineer, it did not bear concussion, and could not be perfectly welded. It has since been stated that these objections are not altogether well founded, and the only difficulty consists in procuring suitable crucibles for the operation.

The working of the method has been submitted to investigation by a committee appointed by the French ministry, and the report[**] states :—That the method is simple and inexpensive, more easily effected than the conversion of pig iron into bar iron, the cost of production not greater than that of the conversion of blister steel into cast steel; that the quality of the steel may be regulated at will; that the steel may be advantageously substituted for malleable iron in many cases, and perhaps for cast steel of second quality, but that it is not likely to be applicable to those purposes for which the best cast steel is used.

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[*] Specification, No. 820, 1856.

[†] *Bulletin de la Soc. de l'Industrie Minérale.*

[‡] Specification, No. 2618, 1855.

[§] Specification, No. 2653, 1855.

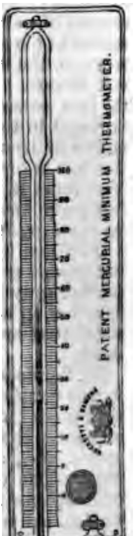
[||] Specification, No. 2189, 1856.

[¶] *Allgemeine Zeitung*, Beilage, 29 Aug., 1856.

[**] *Moniteur Industriel*, No. 2076.

The report also questions the novelty of the method, and in regard to this point, refers to the published statements of Reaumur, Clouet, Mushet, Hassenfratz, which are to the effect that cast steel is produced by melting pig or scrap iron with oxides of iron, but did not lead to any industrial result. The commissioners anticipate that the method admits of being worked, but leave the decision of this point to practical experience.

Dr. Price and Mr. Nicholson have also obtained a patent* for the production of cast steel by melting together the product of the refinery operation and malleable iron in suitable proportions.



Mercurial Minimum Thermometer.—Messrs. Negretti and Zambra have constructed a minimum thermometer, for meteorological observations, with mercury. It consists of a large reservoir, that will admit of the tube in which the mercury rises and falls, being wide enough to receive a steel needle, that serves as an index. This needle is pointed at both ends, and moves freely in the tube, so that it falls as the mercury contracts, but remains stationary when the temperature rises, the mercury passing up between the needle and the side of the tube. The reading of the temperature is taken from the upper end of the needle.

In order to set the instrument, it is placed horizontal, so that the mercury and the needle pass into the upper reservoir. While the thermometer is brought into its proper position again, the needle is held back by a magnet, and then adjusted, so as to be just in contact with the mercury.

The thermometer has been tried at several meteorological observatories, and found to work well, and furnish better results than the alcohol thermometer hitherto used for observing minimum temperatures.

Purification of Alcohol.—Mr. Hyde has obtained a patent† for a method of removing fusel oil and other analogous substances from alcohol. It consists in distilling the alcohol (of 85 or 90 per cent.) over about 1½ per cent. manganate of potash or soda, dissolved in a small quantity of water. By this means the amyl alcohol is converted into valerianic acid, and the other oils undergo a similar change, the acids produced remaining combined with the alkali liberated by the decomposition of the manganate, while the alcohol does not undergo conversion into acetic acid unless an excessive quantity of manganate is used, but distils over pure and odourless.

Preparation of Styracine.—Dr. Gössman‡ has found that the best method of preparing styracine is to macerate storax with five or six times its weight of caustic soda, at a temperature not higher than 86° F., until the insoluble portion, consisting of styracine, becomes colourless, then to filter, wash the residue, dry it, and dissolve in alcohol or ether. If requisite, this solution is decolourized by means of charcoal, and the styracine crystallized. The alkaline solution contains the styrol, which may be obtained by distillation, and the cinnamic acid, which may be obtained in the usual manner from the residue after distillation.

Precipitation of Salts from Solution.—M. Margueritte has obtained a patent§ for a method of separating salts from solution. It consists in saturating the liquid with a gas in a solution of which the salt to be separated does not dissolve. For the separation of chlorides of sodium, potassium, ammonium, barium, &c., hydrochloric acid gas is used. For the separation of carbonate of soda or ferrocyanide of potassium, ammonia is used.

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* Specification, No. 2619.

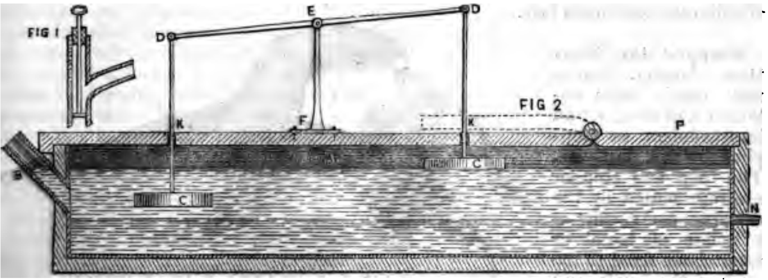
† Specification, No. 2864, 1855.

‡ *Annalen der Chemie und Pharmacie*, xcix., 376.

§ Specification, No. 2655, 1855.

The sulphates of soda and potash and most soluble alkaline salts yield precipitates of the corresponding chlorides when the solutions are saturated with hydrochloric acid gas, and consequently the salt prepared by this method is free from the deliquescent salts, such as chloride of magnesium, &c., with which it is naturally associated.

It is proposed to apply this method so as to utilize the hydrochloric acid produced in the decomposition of chloride of sodium at soda works, in which case the hydrochloric acid solution produced at the same time might be used for generating chlorine in the production of bleaching powder. Or when this cannot be effected, the same hydrochloric acid might be made to serve almost indefinitely for precipitating the salt. This is to be effected by having two closed tanks connected by a tube, one containing a saturated solution of hydrochloric acid, the other the solution of salt to be precipitated. By heating the former, hydrochloric acid gas is evolved, and passes into the solution of salt, effecting precipitation. When the operation has been carried so far that hydrochloric acid gas ceases to be evolved, and a dilute solution of the gas distils over, chloride of sodium is added to the dilute acid, and by this means the evolution of the remaining hydrochloric acid gas is effected. In this way the operation is rendered continuous, the precipitation of the salt from solution being effected in one or other vessel alternately.



Upon the same principle the chlorides of sodium or potassium may be purified by immersion in concentrated solution of hydrochloric acid gas, the double chloride of potassium and magnesium being decomposed, and the chloride of magnesium separated in solution.

Very pure carbonate of soda may be produced from crude soda by saturating the solution with ammoniacal gas, the contaminating substances, chloride of sodium, sulphate of soda, sulphuret of sodium, and caustic soda, being soluble in solution of ammonia.

Lake Colours.—Mr. Gatty has obtained a patent* for a method of preparing lake colours. It consists in precipitating the colour substances of sapan wood, logwood, cochineal, quercitron bark, &c., by means of salts of antimony, particularly the chloride.

Production of Ferrocyanides.—Mr. Johnson has obtained a patent† for the application and use of refuse from gas purifiers, soot, and other refuse from chemical works, &c., spent animal charcoal, and the refuse of prussiate-makers and blood-boilers, for the production of ferrocyanides and their derivatives. The details of the methods adopted are not specified.

Vulcanized Caoutchouc.—Mr. Dodge has obtained a patent‡ for a method of working up waste scraps of caoutchouc. It consists in subjecting the material to the action of a mixture of alcohol and bisulphide of carbon in a close vessel. By this means the scraps are reduced to a soft plastic mass that admits of being worked in the ordinary manner.

Soap.—Mr. Thomas has obtained a patent§ for an improvement in the preparation of soap. It consists in adding to the soap silicate of soda or potash, together with sulphate of soda or potash, in proportion varying according to the kind of soap required. The operation is conducted in a close vessel, furnished at the sides and bottom with a jacket and steam-tight man-hole for charging.

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* Specification, No. 67, 1856.

† Specification, No. 2505, 1855.

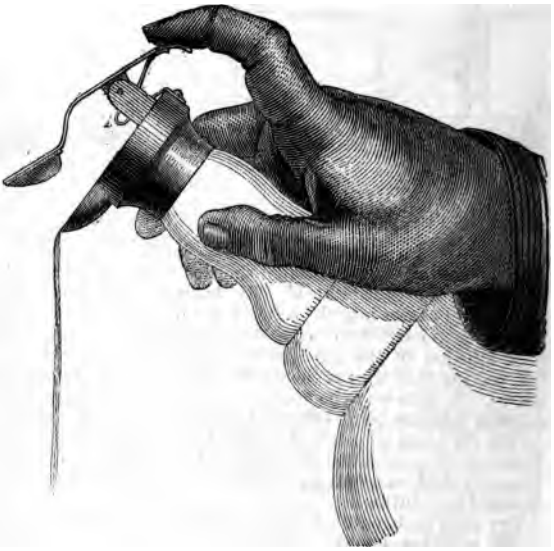
‡ Specification, No. 141, 1856.

§ Specification, No. 2484, 1855.

Treatment of Fats and Oils.—M. Motay has obtained a patent[*] for a method of treating fats, &c. It consists in distilling the lime soaps obtained from the fats, mixing the distillate with from 2 to 15 per cent. of potash, soda, lime, or magnesia, and then distilling again. By this means pyrogenous oils are obtained, which are colourless liquid and free from acid.

M. Fontaine Morean has obtained a patent[†] for a method of preparing fat acids. It consists in digesting the fat with sulphuric acid for several hours, at a temperature of 194° F., with constant agitation, and afterwards distilling the fat acid thus liberated. The method is an application of Braconnot's observations on the action of sulphuric acid upon fats.

Stopper for Bottles.—Messrs. Clarke and Austin have obtained a patent[‡] for an improvement in stopping bottles, jars, &c. The cap and stopper are represented by the drawing, and consist of a collar of metal or caoutchouc fixed to the neck of the bottle, and elongated at one side to form a spout, which is closed air tight by means of a conical plug attached to the end of a lever acted upon by a spring, which keeps the plug in its place. The plug is raised by pressing upon the end of the lever with the fore-finger or thumb.



NOTE ON *WOOD OIL*.

BY M. GUIBOURT.[§]

This curious Indian production, named by the English *Wood Oil* or *Gurjun Balsam*, has already formed the subject of two notices published in the *Pharmaceutical Journal and Transactions*, by Messrs. Charles Lowe[‖] and Daniel Hanbury.[¶]

Mr. Lowe, who knew merely that this resinous liquid is extracted in India from incisions made in a tree, considered it Balsam of Copaiba rendered turbid by a greenish resin suspended in it. [He found that] the filtered balsam formed a brown transparent liquid, which yielded by distillation as follows:

Essential Oil	65
[Hard] Resin	34
Acetic Acid and Water	1
	100

According to Mr. Lowe, the volatile oil possesses all the characters of that of copaiba; and the "*hard* resin," which he regards as pure Copaivic Acid, exempt from the "*soft* resin" which, according to him, exists in the greater part of the copaiba of commerce, appears to him indicative of superiority as a medicine. I must acknowledge that I but ill comprehend this conclusion, and that I am the less convinced of the identity of the hard resin with copaivic acid, since Mr. Lowe has recognized in the new resinous balsam the singular property of becoming solid when exposed in a closed vessel, to a temperature of 230° F. Copaiba presents no similar phenomenon.

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[*] Specification, No. 2566, 1855.

[†] Specification, No. 2626, 1855.

[‡] Specification, No. 435, 1856.

[§] *Journal de Pharmacie et de Chimie*, Sept., 1856, pp. 189—193.

[‖] *Pharm. Journ.*, vol. xiv., p. 65.

[¶] *Pharm. Journ.*, vol. xv., p. 321.

I find stated moreover this difference, viz., that the new balsam distilled with the addition of a small quantity of an oxidizing agent, as chlorine, hypo-chlorite of lime, or bichromate of potash, yields an essential oil of a fine blue, whilst ordinary copaiba containing "*soft* resin" (I still scarcely understand), affords hardly any coloured essential oil. The notice concludes with pointing out a possible sophistication which appears to me little to be feared; it is, that cold sulphuric acid produces with copaiba a purple colouration similar to that obtained with cod-liver oil, so that, as the author supposes, dishonest persons might substitute for the latter, a mixture of olive oil or of some other fatty oil, mixed with a small proportion of copaiba.

Mr. D. Hanbury informs us in his notice, that Wood Oil is extracted from *Dipterocarpus turbinatus* by a very peculiar process, which I will state in a few words, in order the better to show the nature of the product. To obtain the oil, a large incision is made in the trunk of the tree at about 30 inches from the ground, on which a fire is lighted and kept up until the incision is charred: soon after this, the liquid begins to flow. It is conducted by a little trough into a vessel placed to receive it. The average produce of one of the better trees in a single season, is 30 gallons. Roxburgh [from whom this account is taken*] adds that *Wood Oil* is also produced by *Dipterocarpus incanus*, *D. alatus*, and *D. costatus*. The first of these three is reputed to yield the best sort, and in the greatest quantity.

The Wood Oil which forms the subject of Mr. Hanbury's notice has been imported in large quantity from Moulmein in Burmah: when filtered, it is a transparent liquid of a somewhat dark brown when seen by transmitted light, but appearing opaque and of an obscure green if viewed by reflected light. It possesses therefore, in a very marked degree, the dichroïsm observable in all resin-oils obtained by the action of fire. I particularly notice this character which determines the nature of Wood Oil, and shows that it is not simply a natural product like Copaiba; but that it is in part the result of a liquid modification of the *Dipterocarpus* resin, effected by the agency of heat. This Moulmein Wood Oil is of somewhat greater consistence than Olive Oil; it has a sp. gr. of .964, and possesses an odour and taste very analogous to those of copaiba. It dissolves in twice its weight of absolute alcohol, with the exception of a minute residue which is deposited upon repose.

But the most curious property of this oil, already recognized by Mr. Lowe, and afresh observed by Mr. Hanbury, is that of solidifying when heated in a closed vial to 266° F.; at this temperature the oil becomes turbid and so gelatinous, that it is not displaced upon the inversion of the vial. After cooling, the solidification is yet more perfect; but a gentle warmth, assisted by slight agitation, restore its former liquidity. Mr. Lowe has given the temperature of 230° F. for the solidification of the oil: I suppose that the different temperatures noted by these two observers, may be accounted for by some difference in the liquids on which they operated; for as the sorts of copaiba furnished by different species of American *Copaiferæ* and the turpentines by various pines and firs, are not identical, so we may reasonably conclude that the Wood Oils yielded by various species of *Dipterocarpus* are not absolutely similar; the greater or less degree of heat to which the oil has been subjected in the process of extraction, may also cause a variation in the properties of the product.†

What I assert here is not a matter of supposition, but at present of certainty. At the Universal Exhibition of 1855, there were two samples of Wood Oil, the one sent from Canara, the other from Tenasserim. One of these samples (I do not know which), enclosed in a small white earthen pot, which in fineness of paste was midway between stone-ware and porcelain, had been given by Dr. Royle to M. Delesse, the member of the international jury who had been commissioned to report upon the bitumen and petroleum forwarded to the Exhibition. M. Delesse not finding it to be what he was seeking, sent me the specimen, which I judged at once must be the new copaiba announced by Mr. Lowe. In fact, it approached much nearer to the balsam examined by Mr. Lowe than that which has been presented to me by Mr. Hanbury.

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* *Flora Indica* (ed. Carey), vol. ii., p. 613.

† [Note by Mr. Hanbury.]—M. Guibourt's remarks are doubtless just: but my observation was merely to the effect that the phenomenon of solidification was *more strikingly* produced, when the temperature of the Wood Oil was raised to 266° F., instead of to 230° F., as mentioned by Mr. Lowe.—D. H.

The Wood Oil of Mr. Hanbury has almost the liquidity of Olive Oil; held up to the light of the sun, it is seen to be perfectly transparent, and of the colour of dark Malaga wine: seen by reflected light, it appears opaque, and of an olive green. With ammonia and magnesia, it behaves in a very different manner from Copaiba. Mixed with liquid ammonia of 22° B., in the proportion by weight of 5 parts of Wood Oil to 2 parts of alkali, it immediately forms an opaque and very thick mixture, which does not alter by keeping.

It does not solidify upon the addition of a sixteenth of its weight of calcined magnesia, and the two bodies separate upon repose.

The Wood Oil of M. Delesse has the appearance of a thick and slightly gelatinous liquid. After having deposited a small quantity of green resin which was suspended in it, it became almost transparent: placed between the eye and the sun, it is seen to be of a pure deep red: viewed by reflexion, it still appears red, but turbid, and resembles a liquid in which finely-powdered Cochineal might be suspended. The complimentary colour of red is not therefore apparent by this means, but it becomes manifest when, after agitation, a thin layer of liquid covers the upper sides of the bottle. Then, in whatever way we look at this thin layer, it appears of a beautiful green hue.

This same green colour appears again and remains, when, after having dissolved the Wood Oil in alcohol, the solution is left to spontaneous evaporation: one may then see towards the upper part of the capsule, between the portions of green resin, white, starry tufts which are due to a peculiar principle, the future examination of which I leave to those who have a larger quantity of the liquid at their disposal. As to the resin, it has acquired a permanent green hue, which is also perceptible in the dry resin which remains after the Wood Oil has been boiled for a considerable time with water. This green colour, which is that also of the beautiful Piney Resin (*Vateria Indica* L.) that was shown at the Exhibition, establishes a point of relation between two products originating in trees belonging to the same family, that of the *Dipterocarpeæ*. But there the resemblance stops, for the resin of *Vateria Indica* is insoluble in alcohol, and very imperfectly so in ether, whilst the green resin of Wood Oil is easily soluble in either of these menstrua. Finally, the Wood Oil of the Exhibition behaves as Copaiba, when treated with ammonia or calcined magnesia. With one sixteenth of calcined magnesia it very speedily solidifies, and a mixture of it with ammonia becomes liquid, and almost transparent, after an instant of opacity.

I am far from concluding with Mr. Lowe, that the two oleo-resinous bodies [Copaiba and Wood Oil] are chemically identical; but as regards their employment in medicine, I think, as in the case of bodies of analogous composition, such as turpentines and balsams, liquid or solid, all their vegetable components may be of use as a remedy for a catarrhal condition of the mucous membranes. I may remark, in conclusion, that Mr. Hanbury's Wood Oil, and that from the Exhibition, have probably not been extracted by a similar process. It seems to me that the former has been obtained by the action of fire in the manner described by Roxburgh; the latter has doubtless been obtained without the intervention of this agent, for I do not find in it the indication which characterizes oils that are the result of the action of fire upon resins.

OIL OF COTTON SEED AND OIL OF PIGNUT HICKORY.

BY MR. WAYNE.

The manufacture of oil from cotton seed is not a novelty; a small quantity has been made at the South for some years past; lately, however, the demand for lubricators has turned the attention of many to the cotton seed (immense quantities of which are allowed to rot, or used only as manure upon the cotton fields of the South) as a material from which large quantities of oil might be profitably obtained.

At New Orleans I have been informed that a quantity of this oil has been of late produced, a sample of which I have seen. It was a very bland, light coloured oil, said to be made by steaming the seeds and collecting the oil by skimming it from the surface of the water. I cannot vouch for the correctness of the above process.

In Cincinnati some of the oil millers have made the attempt of pressing cotton seed for the oil, but the experiments so far, I believe, have been unsatisfactory, both in regard to the quality of the oil obtained and in the cost of it.

The oil, to be made profitably, should either be manufactured in the vicinity of the cotton plantation,—as the seeds from the attached fibre are bulky, and the cost of transportation an item,—or the seed should be hulled at the spot and shipped to the place where it is to be pressed in that condition, as it requires three or four bushels of seed in the wool to produce one bushel of hulled seed ready for the mill.

The oil as it runs from the press is of a very dark red colour. After standing some time it deposits a portion of the colouring matter, also a portion of a semi-solid fat; and in cold weather this is deposited to a large extent; and is only partially taken up upon increase of temperature. The colour of the oil obtained by pressure is one great objection to its general use, and is very difficult to remove; in bleaching it, at least ten or fifteen per cent. of the oil is lost, a portion of which may be recovered, and used in the manufacture of soap, for which purpose cotton seed oil is better adapted than for any other purpose. It is a drying oil, consequently not fit for lubricating, and when burnt gives a smoky flame, and forms rapidly a crust upon the wick. Others say that it answers for both purposes; but all I have met with, upon being used practically for lubricating or burning, gave unsatisfactory results.

A very good soap is made from it in New Orleans for common purposes: but I think that a soap in every respect equal to the imported Castile could be cheaply made with it.

The dark colour of the oil obtained by pressure is due to the presence of a dark resinous substance, presenting itself in small dots throughout the seed. These may readily be seen by examining a section of the seed with a lens, or even the naked eye.

The hull and attached fibre are useful for paper stock: and the cake left after the extraction of the oil is nearly as valuable a food for cattle as that of linseed.

Mr. Wayne also called attention to a sample of the

OIL OF PIGNUT HICKORY,

of which he gave the following account:

The *Caraya porcina*, commonly known as the pignut hickory, is a forest tree of wide range in North America. This tree produces a nut which contains a very oleaginous kernel, between which and the shell, and the lobes of the kernel, a corky matter of a very astringent taste is deposited. The nut in consequence is not edible, but yields by crushing and pressure a light yellow coloured oil, possessing a bland, slightly astringent taste; the astringent taste is due to the accidental presence of a trace of the astringent matter mentioned, which might easily be removed, and then it would be equal for many purposes of the pharmaceutist to the best olive oil.

This oil has been for several years past an article of commerce in Ohio, the market value of which ranges from $1 to $1.25 per gallon, and the supply of late has not been equal to the demand.

It is very rich in olein, and remains consequently fluid at a much lower temperature than most fixed animal and vegetable oils. During the extreme cold of last winter in Cincinnati, where sperm and other oils were in a solid condition, this oil thickened, but could be readily drawn from the vessel containing it.

As a lubricator it is said by those who have used it to be equal to sperm oil, and for the purposes of illuminating not inferior.

The value and extensive demand at present for oils for lubricating and other purposes, should attract attention to the production of oil from this nut, thousands of bushels of which are allowed yearly to fall to the ground and rot, which if collected and the oil extracted, would cut off the necessary importation of a large amount of oils, such as the rape, olive, &c., and pay a handsome remunerating profit to the maker. I have been informed by those who make it in Ohio, that the yield per bushel is one and a half gallons, and that they purchase the nuts, through the country, of the store-keepers for 50 cents the bushel.—*Proceedings of the American Pharmaceutical Association.*

IODURETTED GLYCERINE IN SKIN DISEASES.

THIS preparation is recommended by Dr. Gage, of New Hampshire, and is made by dissolving one part of iodide of potassium in two parts of glycerine, and turning this liquid upon one part of iodine, which is thus completely dissolved. This solution has the advantage over alcoholic solutions of not drying. By this means the surfaces to which it is applied remain supple, and the action and absorption of the iodine remain for a long time. In employing it, the diseased parts to which the solution has been applied, are covered by paper of gutta percha, to prevent evaporation of the iodine.

ON LIQUIDAMBAR STYRACIFLUA.

BY CHARLES W. WRIGHT, M.D.,

Professor of Chemistry in the Kentucky School of Medicine.

LIQUIDAMBAR STYRACIFLUA, commonly called *sweet-gum*, is indigenous to nearly every part of the United States, and constitutes one of our largest forest trees. When an incision is made through the bark of this tree, a resinous juice exudes, which possesses an agreeable balsamic odour. When this substance first exudes, it is of the consistence of turpentine, and possesses a stronger smell in that condition than it does after it has become resinified. Contrary to the statements made by Wood and Bache in their *Dispensatory*, this tree furnishes a considerable quantity of resin in the Middle States, particularly in the States of Ohio, Indiana, and Kentucky, bordering on the Ohio River. It is annually collected in those States, and sold under the name of *gum-wax*. It is a much more agreeable masticatory than the spruce-gum, and is chewed in the West by nearly all classes. By proper incisions, one tree will yield annually about three pounds of the resin.

The chemical composition of the specimens collected in this latitude correspond with that given by M. Bonastre, of specimens gathered elsewhere, viz.: benzoic acid, a volatile oil, a semi-concrete substance separated by distillation and ether, an oleo-resin, a principle insoluble in water and cold alcohol, termed *styracine*. The bark of the tree contains tannic and gallic acids, to which its astringency is due.

What I wish more particularly to call attention to is the employment of a syrup of the bark of this tree, in diarrhœa and dysentery, and more especially the diarrhœa which is so prevalent among children during the summer months in the Middle States, and which frequently terminates in cholera infantum.

The best formula for the preparation of this syrup is that given in the *United States Pharmacopœia*, for the preparation of the syrup of wild-cherry bark, of which the following is a copy, the sweet-gum bark being substituted for the wild-cherry bark:—

"Take of sweet-gum bark, in coarse powder, five ounces; sugar (refined), two pounds; water, a sufficient quantity. Moisten the bark thoroughly with water, let it stand for twenty-four hours in a close vessel, then transfer it to a percolator, and pour water upon it gradually until a pint of filtered liquor is obtained. To this add the sugar in a bottle, and agitate occasionally until it is dissolved."

The dose of this syrup for an adult is about one fluid ounce, to be given at every operation, as long as the operations continue to recur too frequently.

One advantage which this medicine possesses over most astringent preparations, is that of having an exceedingly pleasant taste, and of being retained by an irritable stomach when almost every other substance is rejected. Children never object to it on the score of bad taste. The resinous and volatile bodies which it contains no doubt enhance its value. My brother, Dr. J. F. Wright, of Columbus, Indiana, has employed this preparation for the past three years in a great number of cases, with the most satisfactory results. He prefers it to any other article where there is an indication for astringent medication in the class of diseases before referred to. In the bowel complaints of children it has a decided advantage over all preparations containing opium, and I am always pleased with the happy results which follow its employment in that class of patients.—*American Journal of the Medical Sciences*, July, 1856.

FLORIDA INDIGO.

Indigo was formerly cultivated in Florida, for which the climate and soil is well adapted. It grows wild upon the barrens in almost every portion of the Peninsula. When cultivated by the English in this country, the indigo of Florida was considered n the London market superior to all others, except that of Caraccas. The manner of cultivating and manufacturing advantageously is as follows :—

The seed, which is very small, is soaked for some twelve hours, then mixed with ashes or sand, and sown in drill rows, about eighteen inches apart. The time for sowing in Florida is from the middle of March to the first of April. When the young plant makes its appearance, it resembles white clover, and must be carefully weeded, and the earth kept loosed about its roots. Three weedings are sufficient to carry it up to the first cutting, which commences when the plant begins to bloom, say about the first of July. The plant is so easily injured by the sun after it is plucked, that the cuttings should be in the afternoon. As fast as it is cut, which is done by a sickle, it is carried to a vat called the steeper. This vat is made of plank, is water-tight, and varies in size according to the extent of the operations of the planter. The steeper is filled with cuttings immersed in water. Planks with weights upon them are then placed on top to keep the cuttings beneath the water. In this state steeping is continued for about ten hours or less, according to the temperature of the water. When the water assumes an olive colour, it is drawn into the "beater," another vat placed alongside and beneath the steeper, and connected by a tube, and fastened with a valve or spigot. The liquid is now churned by hand or with machinery, until it becomes lighter in colour, and a blue fecula begins to make its appearance. From time to time lime-water is thrown into the beater during the "churning." After the fecula spoken of distinctly appears, the water is suffered to remain about four hours for the indigo to settle. It is then drawn off, the sediment placed in bags, and hung up to drain. When drained sufficiently, it is placed in boxes to dry, under gentle pressure ; and when dried firm, it is cut up into square cakes and placed in the shade to become completely dried by evaporation. The shorter the steeping and the less the beating, the lighter will be the colour of the indigo. The indigo plant will yield two or three cuttings a season, and one hand will cultivate about three acres, the result being from 175 to 200 lbs. of the article. Unlike sugar-cane or corn, the indigo requires no expensive machinery. Where it is made only for domestic use, barrels are used for steeping and beating.—*Florida News and American Journal of Pharmacy.*

ELECTRO-CHEMICAL ENGRAVING.

M. Dmrincenzi, a French inventor, has spent some years in the development of an ingenious plan of producing relief printing plates by an electro-chemical process. The metal he employs is zinc, in thin sheets, which are grained with sifted sand, and the design is made upon them with lithographic ink and pen. When the design is finished, it is prepared as if for the lithographic press. For this purpose, the plate is plunged into a decoction of nut-galls for a minute. It is washed in pure water, and gummed with a weak solution of gum-arabic. The plate is moistened with a sponge, the design touched with essence of turpentine, and a lithographic cylinder coated with a varnish rolled over the surface. This varnish covers exactly all the lines made by the designer. The varnish should have the following qualities:—1st, of not altering the design; 2nd, of adhering strongly to the plate; 3rd, of not being attacked by the chemical agents used to engrave it. The varnish known in England as *Brunswick Black*, mixed with oil of lavender, is preferable to all others. It is composed of asphalte varnish, linseed oil boiled with litharge, and turpentine. When the varnish is dry, the zinc plate is put in connexion with a plate of copper, at a distance of one-fifth of an inch, and plunged into a solution of sulphate of zinc, marking fifteen degrees; thus a voltaic couple is formed, and the sulphuric acid dissolves all the uncovered parts of the zinc. More or less depth is given to the engraving, according to the nature of the design. Pencil drawings are generally engraved in four or five minutes, pen drawings in from seven to ten minutes. The sulphate of copper produces no alteration in the most delicate lines, and does not attack the varnish. This mode of engraving may be applied to any other process by which a design is reproduced. The drawing may be made upon paper, and transferred upon the plates. Impressions from lithographic stones, from copper, or steel, may be transferred. Graving tools may also be used as well upon the zinc as upon lithographic stones, for the purpose of producing a flat shade. This process is equally applicable to printing type. It is sufficient to have a page of a book transposed upon a plate of zinc to make a stereotype. The inventor asserts that his process will supplant the common one of stereotyping. By it a page of a book may be transposed during printing, upon thin sheets of zinc, and from these upon quarto sheets, for engraving, whenever a reprint of a published work is demanded.—*Journal of the Society of Arts, Sept.* 5, 1856.

REPORT ON THE INSPECTION OF DRUGS AT THE PORT BALTIMORE.

Having been honoured with an invitation to attend the present meeting of the Pharmaceutical Association, accompanied with an intimation that it would be interesting to the members to learn something of the operation of the law regulating the examination of drugs, as applied at this port, I have accordingly prepared a brief memorandum, giving the character and amount of the articles rejected during my term of service, with the total weight of all articles of the same classes imported; and, lastly, the aggregate of all drugs and medicines introduced during the same time, showing the relative proportion between what has been admitted and what has been rejected. From May, 1853, to the present time, some three years and four months, I have had occasion to reject 40,867 lbs. of various medicinal articles; some directly adulterated; some deficient in active principles, the result of want of judgment in collecting and preparing; some injured by age and exposure; and some by moisture and rough handling in transit. The aggregate amount will hardly seem large if we take into account the long period required to accumulate it. The annual average, contrasted with the whole drug business of our port, will furnish most favourable evidence of the character of our drug market. Within the period named, 760,000 lbs. of Peruvian bark have been brought here, principally from Callao and Africa, some little from Valparaiso, and generally of very superior quality. I have been obliged to reject only 38,062 lbs., and it is but justice to our importers to add, that every pound of rejected bark has been the property of merchants in other places, who found it convenient to order their goods through Baltimore. Within the same period 205,410 lbs. of various roots and seeds have been imported, of which only 367 lbs. have been rejected, and this has been made up principally of ipecacuanha from Rio, and sarsaparilla from the West Indies, injured by exposure to the water. Of herbs and flowers, 29,890 lbs. have been offered, and only 465 lbs., principally German chamomile, found unfit for use, and that from age. The volatile oils have been found adulterated to a much greater extent. Out of 3736 lbs. imported, 1928, lbs. more than one-half, was rejected as deviating too far from the requirements of the law. The oils rejected were principally oil of lemon and oil of juniper, both apparently adulterated with oil of turpentine. Oil of absinth was found diluted with alcohol, and oil of fennel seed with turpentine. If to the articles named we add 50 lbs. of creosote, injured by spontaneous decomposition, and a few pounds of elaterium and lactucarium, badly prepared, we will have the sum total of all the drugs rejected.

Not having access to the records elsewhere, I am unable to furnish any comparative statement in regard to the relative quantity of inferior articles offered here and at other ports. To get a fair statement of the relation between the drugs admitted and those rejected, we need the aggregate amount of all that has been brought into this port since May, 1853. Such statement, to be exactly accurate, would involve more labour than the interest attached to the question seems to warrant; but I can briefly say, that the most important imports, not already enumerated, have been cream of tartar, tartaric acid, carbonate and bi-carbonate of soda, sulphate and carbonate of magnesia, sesqui-carbonate of ammonia, brimstone, borax, cape aloes, calcined magnesia, cantharides, argols and liquorice paste; and that the aggregate weight of these and all other drugs and medicines, not included in the classes already named, would be about 568,624 lbs., making the sum total imported 1,767,660 lbs., and the sum total rejected, as before stated, 40,876 lbs.

There is apparently no room for doubt in regard to the necessity for the Drug Law, and as little room for doubt as to its value in its present form, if properly and uniformly and universally applied. Whether it can be made more efficient, or whether any inconvenience now imposed by it on those engaged in the drug business can be remedied, are legitimate subjects for discussion. Only one instance of apparently deliberate evasion of the law has occurred within my knowledge. This was the work of a merchant residing elsewhere, who accomplished his object by sending his goods, after being rejected here, to a port in the British Provinces, from whence they were returned to one of our Southern ports, where Government has no special examiner, and where the party called upon casually to do the duty of such examiner admitted the invoice. This was subsequently identified by a sample sent to me to determine its commercial value, preliminary to adjusting the duties. In conclusion, I may be allowed to add, that only one case of appeal from the decision of the Government examiner has occurred here, and in that case his decision was confirmed.

Total Weight of Drugs and Medicines imported, and of the same rejected at the Port of Baltimore, from May, 1853, *to Sept.*, 1856.

Peruvian bark,	imported	760,000	lbs.	rejected	38,062	lbs.
Volatile oils,	„	3,736	„	„	1,928	„
Herbs and flowers,	„	29,890	„	„	465	„
Roots and seeds,	„	205,410	„	„	367	„
All other articles,	„	568,624	„	„	54	„
	Total	1,767,660	lbs.		40,876	lbs.

William E. A. Aiken,
Special Examiner of Drugs, &c.

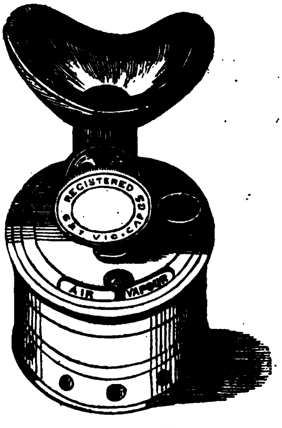
"THE VAPORATEUR."

An Improved Anæsthetic Apparatus, invented by T. P. Salt, Surgical Instrument Maker, Birmingham.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In the November number of your *Journal* there appeared a diagram and description of a new and ingenious apparatus for the administration of chloroform, the invention of M. Duroy, of Paris.

Without discussing the merits of that apparatus, will you permit me to place before your readers a simple apparatus which I have registered for the inhalation of vapour, and which accomplishes the desiderata of an efficient Anæsthetic Instrument.



"The Vaporateur" is exceedingly simple in its mechanism and ready of application. The operator possesses entire control over the quantity and potency of the vapour administered, which he can regulate with exact delicacy, and maintain its effects during the most protracted operation, when they may as quickly be determined.

The apparatus consists of a cylinder, having at its lower extremity a conical sieve, upon which the sponge rests, the object of the sieve being to allow any superfluous chloroform to pass into the receiver, and thus effectually to prevent its inhibition with the vapour.

At the same end of the cylinder is a revolving cap, which closes the small holes around the bottom of the cylinder, and the use of which is to admit the atmospheric air, which becomes impregnated with vapour in its passage through the sponge and the chamber of the vessel.

The top of this cylinder is fitted with a double plate, fastened together by means of a central screw or pivot, having two apertures in the under plate, corresponding with the one seen in the top plate of the diagram.

This plate is moved by means of a thumb-screw from right to left, or *vice versâ*, and its action is as follows:—When the button or thumb-screw is midway in the grooves, as shown in the diagram, the under plate is so positioned that one half of each hole is brought into communication with the circular aperture on the top plate, and the vapour is diluted with one half of free atmospheric air; this may be increased or diminished by turning the thumb-screw to the right or left, as directed by the index.

On the barrel of the apparatus are two valves, which effectually prevent the return of the expired air into the cylinder.

The mouth-piece is constructed with due consideration as to the configuration of the face.

The chief advantage of this invention in addition to its cheapness, is, that the operator knows precisely the exact quantity and potency of vapour administered, and has under his own instantaneous control the means of regulating the proportions at will. It has been many times successfully employed.

I am, Sir, yours respectfully,
T. P. Salt.

POISONING BY OPIUM IN CHINA.

We have been favoured by a correspondent with the following extract from a private letter, dated Shanghai (China), Sept. 1, 1856:—

* * * * *

Since last mail left, we have had a distressing case of suicide on our premises. Our butler, who has a little cottage at the back, in a corner of our compound, married about a year or more ago a young girl from Ningpo. It seems he had been scolding her about some trifling thing, which caused her to commit suicide by swallowing a considerable quantity of opium. When found, she was so far gone it was impossible to do anything. They ran in for me, but I could not tell what to do, and she died in about twenty minutes, just as old Dr. M—— arrived, who, by-the-by, was completely at sea, thinking it was something entirely different. These suicides are very common among the Chinese women, and no particular notice is taken of them. Dr. L —— has saved many people by prompt and vigorous treatment, but instead of feeling grateful, they generally seem rather annoyed they were not allowed quietly to pass away.

The Chinese are certainly a most extraordinary race. Dr. L—— has many poor people brought to the hospital, who, after being restored to health, ask *how much they are to receive for having allowed him to practise on them.* Life and death they consider in such a matter-of-fact point of view, that whenever *wood* happens to be cheap, you find people buying their coffins. These are very thick and massive, and generally painted a bright red. They cost 20, 30, 50, or even 100 dollars ;[*] and the Chinese argue—if we did not buy at leisure, and were to die suddenly, the undertakers would be certain to charge a very high price, knowing that the article must be bought at once. It is considered a very dutiful and proper act for a son to make his father a present of a coffin ; and it is very common to see them in the houses—perhaps the old man sitting on it, smoking his pipe and chatting to his neighbours.

SUICIDE BY LAUDANUM.

An inquest was held on Wednesday, Nov. 5th, before Mr. Bedford, on the body of Elizabeth Myddleton, aged forty-nine. It appeared from the evidence of her husband and other witnesses that she had been in a desponding state. On the Sunday previous she went to a cupboard in which her husband kept laudanum for horses, and drank something out of a phial. Her daughter asked her what she had taken, when the mother coolly replied that she had taken a glass and a half full, and would be stiff presently. She almost immediately became insensible, and was speedily conveyed to St. George's Hospital, where she arrived at a quarter to nine o'clock ; but the resident apothecary, Mr. Porter, was not called till ten o'clock, when all remedies proved unavailing, and she expired next morning. Mr. Porter stated that the deceased died from the effects of laudanum, and he was of opinion that no medical aid, however timely, would have saved her life. The porter, who was tipsy at the time, and another person who was absent from his duty, have been dismissed by the Board of Directors.

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[*] The value of the *dollar* may be estimated at about 6*s.* 8*d.* sterling.

SUICIDE BY LAUDANUM AND OIL OF BITTER ALMONDS.

A MOST painful inquiry took place on Monday, November 17, before Mr. Wakley, the coroner, at University College Hospital, respecting the death of Caroline Hobbs, aged 19, who took poison under the following circumstances:—The deceased had formerly been in the service of a gentleman in Burlington Gardens, and was greatly esteemed. A connexion with some young man arose, which ended in most unfortunate results. In order to hide her shame she left her situation, and took lodgings in the house of a Mrs. Maskell, 5, Augusta Street, Regent's Park. On Tuesday morning, November 11, between nine and ten o'clock, her sister was with her, and found her in very low spirits. She went out afterwards, and returned at half-past eleven o'clock, when she cooked some beefsteak and ate a portion. About half-past one Mrs. Maskell heard a moaning, followed by a heavy fall on the floor; and, upon going to ascertain the cause, found her lying insensible and frothing at the mouth. Two small bottles, labelled respectively "Laudanum—Poison," and "Essential Oil of Bitter Almonds," together with a wine-glass, were found upon the table. A medical man was sent for, by whose directions she was removed to University College Hospital, where she arrived *in articulo mortis*. Mr. Price Jones, the resident surgeon, examined her, and, finding that more than forty-five minutes had elapsed since the oil of bitter almonds had been swallowed, at once concluded that the opium had retarded its action, and thereby offered a chance of her recovery. On this account, and from the weak state she was in, he was afraid to use the stomach-pump lest he should produce asphyxia. Other remedies were applied, but she died at ten minutes before four o'clock. A *post mortem* examination showed that in about ten weeks she would have become a mother. Shortly before swallowing the poison she wrote a letter to her mother, and one to Mrs. Maskell, describing her sufferings, and stating that she was driven to despair. The coroner said he had rarely met with a more melancholy case, and the jury returned a verdict of "Death from swallowing poison." but leaving the state of the deceased's mind an open question.

POISONING WITH OPIUM.

A CORONER'S inquest was held at the Cannon Inn, Russell Square, Brighton, on Saturday afternoon, on the body of William John Mercer, aged five weeks, the infant son of John and Mary Jane Mercer, Cannon Place, who died on the previous morning from the incautious and ignorant use of the syrup of poppies, one of the mildest preparations of opium, but fatal to infants, except in small doses. The mother administered a drachm (about one teaspoonful) of the syrup, the *maximum* dose for infants being just half that quantity. If properly made, one fluid ounce of the syrup of poppies ought to contain the active principles of one grain of the extract of opium. The medical evidence induces the belief that the syrup was adulterated, treacle having been used instead of sugar, the consequences of which is that the ingredients do not get properly mixed.—*Times*, Nov. 12.

The above is quoted from the *Times*. Although syrup of poppies is not a preparation of opium, yet there is reason to fear that opium is sometimes used in its preparation.

ATTEMPTED SUICIDE BY LAUDANUM.

ELIZABETH FOGARTY, aged nineteen, was charged with attempting self-destruction by means of laudanum. She was found lying in a street at Hackney, cold and senseless, with a small bottle, which had contained laudanum, tightly grasped in her hand. A surgeon was sent for, who applied the stomach-pump and restoratives, and she was at length recovered. It appeared in evidence that her father had turned her out of doors, and refused to do anything for her; and that she procured the laudanum of a chemist in the Strand, who allowed her to have it on being told that it was not for herself. A gentleman, representing Messrs. Corbyn and Co., Holborn, stated that the bottle from which the laudanum was taken, bore one of their labels, but the laudanum was not supplied by them, and that it was their invariable practice not to supply any poisons unless the purchaser was provided with an authorization from a medical man. The magistrates, who sympathized with the unfortunate position of the girl, who, a fortnight before, flung herself from one of the bridges into the Thames, have since obtained her admission to the Elizabeth Fry Institution.

LIVERPOOL MUSEUM OF APPLIED SCIENCE.

In the autumn of last year the Committee of the Liverpool Royal Institution decided upon the formation of a Museum of Applied Science, to which the admission should be free, which should contain all the illustrations that could be procured of the natural history of those plants, animals, and minerals, affording products useful to man.

The fitting-up and arrangement of the Museum, together with the collection and classification of the specimens, was entrusted to the care of Mr. T. C. Archer, a gentleman well qualified in every respect for the onerous and varied duties devolving upon him.

This Museum has, during the past month, been thrown open to the public; and, though incomplete in some departments, the large number of specimens brought together and systematically arranged cannot fail to render great service not only to the man of science, but to the merchant, the broker, and the manufacturer, who will, in its cases, find specimens illustrating as far as practicable the commercial history of all the substances entering into applied science.

The importance of such a collection in a commercial town like Liverpool can hardly be overrated, for articles are continually arriving there about which hardly anything is known by the captains who bring them, the merchants to whom they are consigned, or the brokers who have to sell them, and the result is, they are either unsaleable for want of a name, or sold at a great sacrifice because not properly examined. Now, however, this Museum offers a court of appeal, and its utility will soon be appreciated both by the importers and purchasers of raw produce, who, when a new article is brought forward, or in case of dispute, will, as a matter of course, go to the Museum for an opinion as to its nature and value.

We cannot pretend to give more than a cursory sketch of the general nature of the collection; Mr. Archer has very wisely confined his attention in the first instance to perfecting the collection of vegetable products before entering upon those derived from the animal and mineral kingdoms, and has followed the arrangement which has afforded so much satisfaction and instruction in the Royal Kew Gardens.

Amongst the specimens collected are all the imports into Liverpool arranged under their natural orders according to the affinities of the plants producing them; and what is of the utmost importance all correctly named and described. Side by side are specimens of various articles into which these rare products are manufactured both at home and abroad, affording at a glance an amount of information which could not in any other way be so quickly or thoroughly conveyed, and which cannot fail to be appreciated by every intelligent observer.

Amongst the contributions there are also many valuable and interesting collections from manufacturers of specimens of articles to the preparation of which they respectively devote especial attention.

Altogether this Museum reflects great credit upon the committee of the Institution to which it belongs for the liberality they have shown in its establishment, and its honorary director, Mr. Archer, is entitled to much praise for the time and attention he has for a long period devoted to it, and the energy and skill displayed in its arrangement and systematic classification.

THE ODONTOLOGICAL SOCIETY.

In accordance with the general feeling of the profession that a Society of Dentists should be formed, capable of supporting itself on an equality with other learned societies in this country, a Meeting was convened in November, 1855. It was then proposed by the undersigned members of the profession to memorialize the Royal College of Surgeons on the necessity which existed for some recognized qualification for those practising this speciality of surgery. This suggestion was carried into effect, and on the 11th of December, 1855, an appeal to the College was made, stating the great benefit the public would derive, and the advantage which would accrue to the profession generally, if a diploma were granted to those who passed an examination in this branch of anatomical science. The memorial was received, and is still under the consideration of the Council. This important measure being thus in abeyance, it was deemed by the memorialists desirable to commence, without further delay, the operations of the Society. At a Meeting held for this purpose in November, 1856, the bye-laws for the Society were framed, on the model of those of isting medical societies; it was also determined that invitations should be sent to ose Members of the profession who were either personally known to the memoalists, or were deemed anxious to promote the well-being of the Society. This plan selecting from amongst so many who are eligible, would appear somewhat invi-ious; but the absolute necessity of securing at the outset a working body, the feeling which would be unanimous, seemed to demand that certain limits should be placed pon the selection. It is believed, that by the means adopted, a nucleus will be rmed, including the names of many gentlemen well known in the profession, pable of embracing, ultimately, within its circle, all those who may desire to evote their attention to the objects comprehended by the Society.

S. Cartwright, F.R.S.
J. H. Parkinson.
J. H. Parkinson, jun., M.R.C.S.
E. Saunders, F.R.C.S.
William M. Bigg.
S. Cartwright, jun., M.R.C.S.
G. A. Ibbotson, M.R.C.S.
James Parkinson.
J. Tomes, F.R.S.
H. J. Featherstone.
A. Canton, M.R.C.S.
R. Nasmyth, M.D., M.R.C.S.
J. L. Craigie, F.R.C.S.
H. J. Barrett, M.R.C.S.
A. Rogers, F.R.C.S.
T. A. Rogers, M.R.C.S.
H. Shelley, M.B., London, M.R.C.S.
S. James A. Salter, M.B., M.R.C.S., F.L.S.

The following Bye-laws and Regulations define the objects and constitution of the ociety:—

1. This Society is instituted for the encouragement and diffusion of knowledge f Dental Surgery, and for the promotion of intercourse among Members of the ental profession.

2. The Society shall consist of Resident, Non-Resident, and Honorary Members.

3. Persons distinguished in any department of science connected with medicine, hall be eligible for nomination as Members.

4. Those persons who advertise their professional qualifications, either in the ublic journals, or by the distribution of hand-bills, &c., or who expose, for public nspection, specimens of operative or mechanical dentistry, shall not be considered ligible for nomination as Members.

5. Any Candidate holding a patent relating to the requirements of Dental ractice, shall, on being elected, relinquish his exclusive right in favour of the Members of this Society.

6. Such Members as reside within ten miles of the Post Office, shall be considered as Resident Members; all others, as Non-Resident.

7. The Officers of the Society shall be elected from the Members, and shall consist of a President, two or more Vice-Presidents, a Treasurer, and three Secretaries, who, with nine other Members, shall constitute the Council, and shall have the management of the Society's affairs.

SOCIETY OF DENTISTS.

A Public Meeting of the Members of the Dental Profession was held on Monday, the 22nd of September, Mr. Alfred Carpenter in the chair, to take into consideration the anomalous state of the profession, and the propriety of forming an association on similar principles to those existing in other branches of the medical profession. At that meeting it was the unanimous opinion that a Society of Dentists should be established forthwith, and that a College of Dental Surgery was highly requisite. Resolutions to such effect having been passed, a Committee was appointed to consider the best means of carrying them into practice.

The report of this Committee was presented to the profession at a large and influential meeting, presided over by Mr. James Robinson, of Gower Street, on Tuesday evening, Nov. 11, at the Freemasons' Tavern, when the immediate formation of a Dental Society was recommended, and warmly approved by those present. The adoption of the report was proposed and seconded by Mr. D. Mackenzie and Mr. Adam Thomson respectively. A vote of thanks was then passed to the Committee for their exertions, and they were requested to continue their services until the final completion of the Society in December. The objects of the meeting were warmly supported by Mr. Tibbs, of Cheltenham, Mr. Gray, Mr. Rymer, of Croydon, and many others. A cordial vote of thanks to the Chairman terminated the proceedings.

BOOKS RECEIVED.

A Treatise on Therapeutics and Pharmacology, or Materia Medica. By George B. Wood, M.D., &c., &c. In two volumes, pp. 840 and 901. Philadelphia: J. B. Lippincott and Co. London: Trübner and Co. 1856. (From the Author.)

A Supplement to the Pharmacopœia; being a concise but comprehensive Dispensatory, and Manual of facts and formulæ, for the use of Practitioners in Medicine and Pharmacy. By Theophilus Redwood, Ph.D., &c., &c. Third Edition. London: Longman and Co.; Simpkin and Co.; John Churchill; Henry Bohn; and Henry Renshaw. 8vo, pp. 1161. 1857.

The Bane and its Antidote; or, Poisoning and its Suppression, pp. 15. By Walter Wilson. London: Wertheim & Macintosh. Birmingham: T. Ragg. 1856.

On Poisoning by Strychnia; with Comments on the Medical Evidence given at the Trial of William Palmer for the Murder of John Parsons Cook, pp. 152. By Alfred S. Taylor, M.D., F.R.S., &c. London: Longman, Brown, Green, Longmans, and Roberts. 1856. (From the Author.)

TO CORRESPONDENTS.

Æsculapius (Birkenhead).—*Cod liver oil with quinine.* Vol. xv., p. 239.

Phœnix (London).—The specimen of precipitated sulphur forwarded to us contained a large proportion of sulphate of lime.

A. B. A.—A pamphlet "On the uses of Glycerine," by G. F. Wilson, F.R.S. Published by W. H. Smith and Son, Strand.

H. M. (Bristol).—*The London Pharmacopœia.* Published by Churchill.

W. B. (Stroud).—We presume that the article sold as "Pickrick," is picric acid, which is sometimes obtained by the action of nitric acid on coal tar, and is used in dyeing. *E. C.* (Calne).—Olive oil.

A Member (Norfolk).—Fownes's *Manual of Chemistry.*

An Apprentice (Whitchurch).—*Ancient and Modern Colours,* by W. Linton. Published by Longman.

Ferrum (Eastwood).—(1.) The label referred to is not liable to stamp duty.—(2.) Redwood's *Supplement to the Pharmacopœia,* 22*s.*

W. S. (Leeds).—We know no formula for *liquor papaveris.*

J. T. (York).—The odour could scarcely fail to be recognized.

A. P. S.—Cod liver oil is sometimes flavoured by the addition of a few drops of the oil of orange peel.

Veritas (London), *A Correspondent* (Paisley), *Chemicus* (Glossop).—The particulars of such cases of imposition should be forwarded to the Council of the Pharmaceutical Society.

An Associate (Liverpool).—*Syrupus Ferri Phosphatis.* Vol. xii., p. 311.

F. A. B. (Longton).—(1.) Amalgams for the teeth are usually made with gold or silver with mercury, the excess of the latter being squeezed out.—(2.) Probably.—(3.) See any elementary work on Chemistry.—(4.) A medical practitioner would be better able to answer the question.—(5) and (6) are not intelligible.

J. B. G. (Oldham).—An apprentice may continue his connexion with the Society, although transferred to a Chemist who is not a member.

A Druggist (Ramsgate).—It would be necessary to prove that the article was damaged when sold.

Pharmacien (London) suggests—(1.) That some evening lectures would be desirable for young men who cannot get out in the morning.—(2.) ℔ss., ½-pound Troy, of course means 6 oz. *J. T.* (Enfield).—The notice is in this number, p. 302.

Sale of Poisons.—We have several articles in type on this and other subjects, which want of space obliges us to defer until next month. The description of Bessemer's process, page 327, has been in type more than two months, but was deferred from the above cause.

Chemicus.—We know of no such process as that referred to.

R. A. P. S.—The oil referred to does not appear to differ from that made by the old and well-known process for oil of bricks.

Erratum.—Page 295, line 4 from bottom, *for* "1 gallon" *read* "2 gallons."

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd) to Mr. Churchill, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XVI.—No. VII.—JANUARY 1st, 1857.

THE STUDENTS' GRIEVANCE.

It never was our intention or wish to make light of the hardships endured by young men in the probationary state between the toils of school and the cares of business—those few eventful years, upon the right use of which their future success in life so much depends. We have endeavoured to encourage the diffident, to stimulate the thoughtless, to keep constantly before the mind's eye of all the point of distance towards which they ought to aspire as the reward of labour and perseverance.

It has been gratifying occasionally to illustrate arguments by reference to facts, adducing instances in which the pursuit of knowledge under difficulties has been attended with signal success; and, while advocating every practicable scheme for promoting education, we have pointed out what has been done *without*, and how much more might be accomplished *with* such advantages.

But we cannot join in the lachrymose and pathetic strain in which some of our Correspondents indulge, believing as we do that it is not only useless, but mischievous, to deal with the subject in that way. Every occupation or position in life has its bitters as well as its sweets, its pressure of labour and intervals of respite. From the idle man who has nothing on earth to do but to kill each tedious day—to the slave who prematurely dies under the lash of American freedom, there is a sliding scale, representing the fate of mankind, made up of rest and labour in various proportions. That which is labour to one man is recreation to another, and the amount of endurance, whether of hardship or of fatigue, is dependent in a great degree on the state of mind of the individual. The pampered victim of ennui, born with a silver spoon in his mouth, whose energies are stimulated neither by hope nor fear, is annoyed by every trifling interference with his caprices, and bears up with difficulty against his imaginary misfortunes; and there are few persons whose minds are naturally strong enough to resist the enervating influence of unchequered prosperity. On the other hand, it is worthy of remark, that the men who have risen to the greatest eminence in their several vocations, who have been held up as examples for contemporaries to imitate and for posterity to admire, have in numerous instances been the pioneers of their own success through difficulties apparently almost insurmountable. Some of our greatest chemists, philosophers, builders, engineers, manufacturers, in fact, some of the most distinguished members of each profession or business, have risen from comparatively obscure positions, and left their more favoured but less persevering rivals far behind, as the tortoise outran the hare in the race.

On reading the biographies of such men, there is one predominant feature in which they resemble each other, namely, the influence of a strong will, the persevering energy of the mind in sustaining the bodily powers and resisting the ordinary depression of protracted labour. During the competition for a prize, or reading for honours at college, while the urgency of the object desired keeps the nerves at full stretch, fatigue is scarcely felt. So also the anxiety of nursing a sick friend or relation, the necessity for constant vigilance, compensates for the loss of rest, and the bodily strength is sustained by mental elasticity.

These, it may be said, are extreme cases, and although the constitution may bear up against the pressure during the existence of the exciting cause, yet if this be protracted beyond certain limits, the health will become undermined, or when the stimulus is removed the energy will naturally subside, and a reaction will take place. To some extent this is the case; but the fact to which we desire to direct attention is the power of the mind when stimulated by hope and laudable ambition, to overcome the *vis inertiæ* of lassitude, and impart endurance of fatigue. Reverting to the original object of these general remarks, and comparing the position of the Pharmaceutical Students of the present time with that of their employers in years past, we find that a tendency prevails to shorten the hours of business, and to give additional facilities for improvement. There may be exceptions, but we know that in many localities where the hour of closing was formerly eleven, it is now nine, and although a few customers may come after that hour, the alteration is generally understood, and is observed by the majority. No inconvenience is felt where the early closing is adopted, and we hope the custom will be more extensively introduced.

To some extent, therefore, a portion of the pressure is removed, or in process of removal, from the Pharmaceutical Students; and, in a friendly spirit, with a desire for their advantage, we last month invited attention to the apparently neglected facilities for improvement offered by the Society. This has called forth several pathetic and somewhat indignant communications, in which "exhausted nature" is represented in a pitiable plight, and the hardship of reading works on Chemistry and Materia Medica after a day's work, is pointed out with eloquence worthy of a better cause. Five-and-twenty years ago, with more work, and a scanty supply of books, with no Society to stimulate us, or professors to direct our course of study, we were left to our own resources to pick up the crumbs of science, after ten or eleven at night, or before breakfast in the morning. Several of the present Members of the Council were fellow-students under these adverse circumstances. "Exhausted nature" whispered in their ears (as usual), "Don't read,—go to bed, or go somewhere for recreation,—anything but study:" but this was in some degree counteracted by a consciousness of the fact that it was needful to study—that no other opportunity would occur, and that future success in business would depend on the industry and energy devoted to the acquirement of the requisite knowledge. The determination to master a subject and obtain information for a specific purpose begets an interest in all its details, and the labour of study is found to be a rather agreeable change after the labour of filling bottles and folding up parcels. This is no theoretical notion, but is founded on the experience of Members of the Society, now carrying on thriving business, who, if they should happen to read these observations, will be reminded of their early struggles against "exhausted nature" late at night, or early in the morning. We are told by some of our Correspondents that the inducement to study is not sufficient. Mr. Collins[*] describes this as "Another Thing Forgotten." The inducement is as great now as it was twenty-five years ago; in fact, it is greater and more palpable. At that time, the notion of a recognized Pharmaceutical qualification, with or without an honorary title, was a theory which existed only in the brains of those who afterwards suggested the establishment of a Society for reducing the theory to a practical result. Now this has been so far carried into effect, that the *status* of a Pharmaceutical Chemist is recognized and protected by Act of Parliament, and there is every reason to expect that the powers, privileges, and influence of the Society will be further extended and more effectually brought into operation. Young men who are incapable of appreciating the advantages thus held out to them as the reward of industry and studious application, should not have been let loose from the nursery. They would have been safer tied to their mother's apron strings, with their bread and butter carefully prepared for them, than thrown upon the wide world to make their way in a profession requiring perseverance and the exercise of the intellectual faculties.

We entirely agree with all that has been said in favour of devoting a portion of the apprenticeship exclusively to scientific education, instead of deferring it until a later period, when the pressure of business is more urgent. But this argument is prospective: it is addressed to the parents and guardians of future Pharmaceutical Chemists, and cannot refer to those who have already served their apprenticeship. It is useless to taunt young men with what they (or rather their parents) ought to have done to secure during the apprenticeship the requisite opportunities for study; but those who have not enjoyed these advantages should be urged and encouraged to make up for lost time by additional ndustry. It is right to bear in mind that all do not enjoy equal opportunities for improvement. The difference in locality, the business and domestic arrangements of the establishment, the indulgence or otherwise of employers, must be taken into consideration before any general criticism can justly be passed upon the Students as a class. But we cannot shut our eyes to the fact that where the greatest facilities are afforded, they are not taken advantage of to the extent that might have been expected. We also meet with instances, occasionally, in which great credit is due to young men who, with every obstacle thrown in their way by prejudiced employers, have nevertheless persevered and surprised their friends.

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[*] Page 382.

The Library of the Society having been a subject of discussion, we may suggest a mode in which it might be usefully resorted to by those who reside within a convenient distance. Supposing twenty or thirty young men to form themselves into a class for mutual improvement, and appoint two or more evenings in the week to meet in the library at half-past eight or nine, arranging beforehand the subject to be discussed, and taking in rotation the office of examiner or chairman for the evening. This plan has been adopted in some houses of business where there are several Assistants, and some rather interesting discussions on Chemistry, Materia Medica, &c., have taken place after ten or eleven in the evening. Each member of the class is thus encouraged to read and prepare himself for the subject about to come forward.

We need scarcely add, that if such a mode of meeting for the purpose of improvement were to originate among the Associates of the Society in London, the rooms at Bloomsbury Square afford every facility that could be desired, and the Council would be glad to encourage the endeavour to make the Society practically useful.

PRECAUTIONS AGAINST ACCIDENTS,—FROM POISON, &c.

Among other suggestions for guarding against casualties and fatal consequences from poisons and strong medicines, we have received from a Correspondent in Dublin a draft of a proposed Act of Parliament, which, although not written in sober seriousness, contains two or three home truths worthy of a passing remark. It is founded on the recent order of the Dublin College of Physicians, to protect the public against accidents from poison by the angular pot and bottle regulation already discussed in this Journal; and the counter proposition purports to emanate from the apprentices of Apothecaries, who state in the preamble—

"Whereas great uncertainty and confusion, as well as danger to the public health, have arisen from the hasty and illegible manner in which prescriptions are sometimes written,

"Be it therefore ordered:

"1. That all prescriptions be written in a clear, distinct, and legible hand, displaying such moderate acquaintance with the principles of Chemistry as the prescriber is capable of.

"2. That all prescriptions intended for internal use be written with black ink; that such as are intended for external use be written with red ink exclusively.

"3. That all prescriptions intended for internal use, and containing poisonous ingredients, be written with black ink on black-bordered letter paper (*i. e.*, mourning paper); that those intended for external use, and containing poisonous ingredients, be written in red ink on black-bordered letter paper; the depth of the black border to denote the intensity of the poison. For example, narrow for tartar emetic, paregoric elixir, &c.; deeper for tincture of opium, digitalis, &c.; still deeper for aconitina, arsenic, strychnia, &c.

"4. That no tender of a fee be considered a legal tender by any Fellow of the College unless made in an angular form (*i.e.*, in bank-note or cheque); that no tender of a fee be considered a legal tender by a Licentiate of the College, unless made in the round form (*i. e.*, sovereign, half-sovereign, or silver)."

The article before us is much too verbose for publication, but the above extracts are quoted from it because they furnish an apt illustration of the impracticable nature of the round and angular precaution against poisoning, and also direct attention to a precaution which it is in the power of any medical practitioner to adopt, and which would relieve Dispensers of medicine from some doubt and perplexity now occasionally experienced. The faculty of reading a prescription is quite distinct from, and should be superadded to, the ordinary knowledge of Chemistry and Pharmacy. It has not unfrequently occurred at examinations that a candidate well acquainted with the science of his profession, and capable of performing the processes of the Pharmacopœia and ordinary chemical analysis, has been at fault when called upon to read some of the prescriptions which are selected as fair specimens to test his experience in dispensing. To those who have had considerable practice in this department, the ordinary writing and contractions are intelligible; even when the words are not legibly formed, a knowledge of the custom of the prescriber, and the peculiarities of his handwriting, will often clear up what might otherwise have been doubtful; and the habit of reading prescriptions enables the experienced Dispenser to see at a glance the nature and object of the medicine ordered, whether it can be quickly prepared, or contains any infusion or other ingredient which will cause delay; and if there be an omission or oversight, or a poisonous dose, his eye detects it instinctively. But this quickness of eye (like that of the juggler, who throws up and catches five balls at a time) is only acquired by years of practice and observation; and it is scarcely to be expected that young men fresh from their apprenticeship will immediately become familiar with all the varieties of orthography, stenographic abbreviations, and conventionalities which occur in prescriptions. The contractions, symbols, and technical terms used in Latin prescriptions are easily learned, and, when understood, are more readily deciphered than a prolix English prescription, with all the words written at full length; but it will scarcely be thought unreasonable to suggest, as one precaution against accidents in medicine, a little more attention to the orthography of prescriptions.

THE DISPENSING OF MEDICINE IN THE ARMY.

We have received for inspection, and publication if we think proper, a copy of the depositions at the inquest in the case of poisoning by strychnia, referred to by Mr. Macfarlane at the Pharmaceutical Meeting, Nov. 5th (last number, page 314). We think it unnecessary to give publicity to all the unfortunate details of such cases, with the names of the parties concerned, who, without doubt, have suffered greatly from the anxiety and regret inseparable from the misfortune. The object with which allusion is made to passing events of that nature is the prevention of a recurrence of similar accidents, by tracing the cause, and adopting in future such precautions as experience may suggest.

There are some circumstances in the case before us which are important and deserving of notice, and these we shall briefly state, as the accident did not occur precisely in the way described by Mr. Macfarlane's informant. The accident took place in August last, at the Medical Depôt, Kingston, Jamaica; where it transpired at the inquest that a black servant was employed as "packer." It came under his province to paste the labels on the bottles, each label being prepared and placed under the right bottle by the Doctor of the regiment. He

been in that office twenty-eight years, and could read a little. On the
sion in question some medicines were being put up for the depôt at New-
e (Jamaica), and the doctor superintended the labelling as usual, until the
bottle, at which moment he was suddenly called away. The packer having
small phial still unlabelled, and seeing a label on the doctor's desk, pasted
, and sent off the medicines duly packed to their destination. It happened
the label (a written one) was "bismuth trisnitras," but the phial contained
hnia. The packer knew that there was poison among the drugs, but did
know the nature of it, or which bottle contained it. His duty was the
anical task of pasting each label on the bottle shown him as the right one.
evidence proceeds to trace the package of the medicines to their destination
ewcastle, where they were unpacked in the presence of the medical officer
e regiment in that quarter. It is stated to be the rule, that no medicine
d be unpacked and placed in the stock for use until the medical officer on
has seen it, and satisfied himself as to its accuracy; but, by some fatality
is occasion, a sergeant of the regiment (who, it appears, was employed to
in the surgery) emptied the unfortunate bottle into the one having a
sponding label,—namely, bismuth trisnitras. The number of bottles had
counted, and found to correspond with the number of articles ordered; but
s not observed, in the first instance, that no strychnia appeared among the
cines sent (although some had been ordered), and that there were two
s, one much smaller than the other, both labelled bismuth. Before
tion had been directed to this circumstance, the prescription for powders
ining bismuth was brought to be prepared. The next witness, a private
36th Regiment, who officiated as hospital orderly, prepared the prescription
the instructions of the doctor. He remarked that the bottle was fuller
before, and the former witness told him he had replenished it. He also
d a slight difference in the colour of the powder, but this did not seem
ite suspicion of any mistake. The remainder of the evidence confirms in
ential particulars the account given by Mr. Macfarlane; but it is needless
o trace the delivery of the medicine from one messenger to another until
ched its destination, and the administration of the fatal dose to the patient.
ymptoms which occurred a few minutes afterwards are so analogous to those
ibed in the case of Palmer and others lately before the public, that it is
ent to state that no doubt existed as to the cause, and the alarm and agony
e family, and especially the husband of the patient, may be imagined.
details, however, we need not dwell upon; but the important question to
we wish to direct attention is, the practice of employing as hospital order-
nd packers persons uneducated for that office, who can read "a little,"
ho are ignorant of the nature of medicines, and who mechanically execute
heir hands the orders emanating from the doctor's head.

Report of the Select Committee of the House of Commons on the Medical
tment of the Army, ordered to be printed 3rd July, 1856, contains some
le information appropriate to the case before us. The Report, including
idence, occupies a blue book of 379 pages. A few extracts will be suffi-
to show the grave importance of the subject. We select the following
the evidence of Dr. Smith:—

> 3. Mr. *Peel.*] What is the next subject that you wish to bring before the Com-
> ?—The next subject is the employing of enlisted soldiers to compound and
> se medicines. When I entered the service in 1815, and for a long period
> uently, that was to a certain extent the practice; but from time to time mis-
> es arose, medicines were mistaken; one medicine was given for another
> ine, and various very serious consequences resulted, which led, about 1846, to
> prohibition of the employment of sergeants and other men who had formerly
> n the habit of compounding and dispensing medicines.
>
>). *Chairman.*] Is that the order which is before you?—Yes. There was a case
> an losing his life through a mistake of that kind in the West Indies; and the

late Duke of Wellington then insisted upon putting an entire stop to the practice, and brought out this circular letter, which was sent to every medical officer. Since that time it has been understood, and I am bound to believe that it is acted upon, that the medical officers themselves (though I know they are much averse to doing it) have compounded the medicines. I will hand in the circular.

[*The same was delivered in, and is as follows :—*]

Army Medical Department,
31 January, 1846.

SIR,

With reference to the eighth page of the Regulations for the Management of Army Hospitals, dated War Office, 1845, and more particularly to the paragraph prohibiting the delegation of medical duties to sergeants and orderlies, the neglect of which prohibition has been brought under the notice of his Grace the Commander-in-Chief, and investigation by a court of inquiry having discovered that in one instance there is reason to believe fatal effects had ensued from such neglect, I have in consequence been commanded to call the attention of every medical officer to the subject, and to declare that every future case of disobedience in this respect will immediately be sent to trial before a general court-martial.

The superintending medical officer on each station has been ordered to report the name of any medical officer who shall have permitted an hospital sergeant or orderly to prepare medicines, dress wounds or ulcers, apply bandages, or be employed in any professional duty whatever.

In your annual return of sick, you will state whether the order in question has been complied with in every instance; the superintending medical officers having been directed, whenever on their inspection visits they discover an act of disobedience of this nature, to report the same to the commanding officer of the regiment, and likewise to the general officer in command, as well as to me.

I have, &c.

N.B.—The receipt of this circular to be acknowledged. Director-General.

4620. Those men, of whom you spoke, that mixed the medicines with such disastrous results, were uneducated men?—They were uneducated men, except so far, that they were educated by the surgeon of the regiment. They had a sort of half-way knowledge of Latin terms. They used to make up the medicines; and it sometimes happened that they gave a wrong medicine; a poisonous medicine. I do not know that I could exactly state all that happened. In other instances they have given medicine of a harmless nature for the treatment of a disease, when another medicine had been prescribed that was adapted for that disease, and evil consequences have resulted from that, so far that the patient did not recover. He did not reap the advantage he would have done had the proper medicine been given. I am aware of a number of cases of a very serious description that have arisen from the practice. I have known a case of a man being ordered to give sulphur ointment, and he gave cantharides ointment, the sulphur ointment being intended for a certain cutaneous disease. The person who got it rubbed the body over with that cantharides ointment, which is a blistering ointment, and the person died. It was a woman.

4621. How long ago was that?—It was at Windsor, about 14 or 15 years ago. There was a case at Chatham lately; a man employed in the capacity of a surgery man, a soldier, a man who was supposed to know medicines pretty well, unfortunately did something that led to the death of a man at Chatham.

4622. Was not there an inquest upon that occasion ?—There was.

4623. And a trial ?—Yes.

4624. Was the military surgeon found guilty ?—The military surgeon was acquitted as a matter of course, because he had nothing to do with it. It was a corporal.

4641. Colonel *North.*] If I rightly understand the objection you have to sergeants compounding medicines it is this, that they would accurately compound what the surgeon gave them, but that if the surgeon by any accident, being in a hurry or in a flurry, made a mistake, the sergeant would not discover it ?—That is a second objection which I want to raise.

4642. *Chairman.*] Do you say that that has taken place?—Yes; I will mention another case which occurred to myself; when I was thoughtless enough, on one occasion, when I was very young in the service, to prescribe some extract of colocynth pills; two. I desired the hospital sergeant, being in a hurry myself, to make up two five-grain pills of extract of colocynth, with some addition to them; I believe some calomel; I took for granted that he did the thing correctly; instead, however, of extract of colocynth, he made up two five-grain pills of extract of opium, which were sent to the house to be used; I happened to be rather late at the house that evening, fortunately; each of the persons for whom a pill was intended, took one, and they would have been dead in a short time if I had not been there to adopt the proper measures to keep them alive.

4643. Had that man had any training in the hospital?—He had just had the usual training, the medical officer instructing him.

4644. Are you aware that this practice of the hospital sergeant dispensing the medicine exists in the regiments of the Household troops?—I cannot speak with reference to the Household troops beyond what I have seen in the evidence taken before the Committee.

4645. Mr. *Percy.*] Do not such mistakes occur in civil practice?—I believe they occasionally occur, but the object is to find out the system that will afford the least chance of their occurring; a medical man in a hurry occasionally may write an ounce of some medicine instead of a drachm; if that goes to an apothecary's shop in London, the error is seen immediately, and no mischief ensues: and the kind of men that we have now in the service would at once see that that was wrong, and communicate immediately with the medical officer, and would not make up the prescription; but a sergeant or a private, who is not sufficiently aware of the doses of medicines, would make up the prescription as it stands, and the consequence would be that a man very likely would be killed.

4646. Sir *James Fergusson.*]—Do not the mistakes that occasionally occur, generally occur from the mistakes of dispensers in apothecaries' shops?—No; I think they are more generally from the mistake of the medical man writing in a hurry, and putting, for example, an ounce instead of a drachm.

4647. Have you not seen in the public papers frequently reports of cases in which poisons have been given by mistake in apothecaries' shops?—I have seen sometimes cases; but looking at the immense quantity of medicine that is dispensed day by day, I think such cases are very infrequent. Then I wish to state that I am aware of many other instances of cases of the kind having occurred. There was a case of a surgeon of the 88th Regiment in Corfu; at a time when he was labouring under severe dysentery, the assistant-surgeon prescribed for him an ounce of castor oil, which was the proper remedy under the circumstances of the case; it was sent to the hospital, and the hospital sergeant mistook the prescription for balsam of copaiba, and sent up balsam of copaiba, the last thing likely to be advantageous to the man, and the man died in the course of two days. I do not mean to say that he died entirely in consequence of this wrong medicine, but certainly he would have had a better chance of living if he had got the castor oil instead of the balsam of copaiba. I will mention one or two other cases, because I think it important; indeed, my conscience compels me to mention these matters; and having once done so, whatever measures may be adopted, I shall feel that I am not responsible. There was a case at Chatham: when I was the principal medical officer, I went into the surgery to see whether the surgery-man was not dispensing medicines; I placed myself by the fireplace, the surgery-man's back was to me; an orderly came in, who did not observe me standing there, and he went up to him with a paper in his hand; he gave him a paper, and the man took some medicine and measured it, and put it into a gallipot, and the orderly took it away in his hand. As soon as he had gone, I moved away from the fireplace and took the bottle to see what he had done, and I found that he had given sulphuric acid, pure oil of vitriol, instead of diluted sulphuric acid; I went out immediately after the man and took away the medicine. There is another case within my recollection, which occurred, I think, at Canterbury. A man had been ordered half-an-ounce of diluted sulphuric acid, and instead of that he was given pure sulphuric acid; he swallowed it, and sloughing took place in the inside of the mouth, and gullet and stomach, and the man eventually died. Now those are cases which have come within my own knowledge, and therefore I am particularly afraid of trusting men who are not, first of all, tolerably good Latin scholars; and secondly, men whose minds have not, when young, been directed to the preparation of medicines, and fully impressed with the danger of certain drugs, and particularly with reference to over-doses.

Among the recommendations of the Select Committee we quote the following, which has reference to the question before us:—

14. That a person duly qualified to compound medicines, and attested for military service, should form a part of the medical establishment of every regiment,

and that those persons should be selected either from the Medical Staff Corps, from the ranks of the regular army, or from the orphan sons of soldiers educated at the Military Asylum ; that they should be regularly trained and educated with a view to the duties to be discharged, and that no one shall be considered eligible for employment until he has given proof, on examination before a Board, that he may, with safety to the sick soldier, be entrusted to compound the medicines to be administered to him.

The terms of this recommendation are too indefinite to indicate more than a partial remedy for the existing defect. As the law now stands, the Army Surgeons are supposed to dispense the medicines themselves, but, in practice, this office is frequently performed by orderlies, trained by the Surgeons to a certain extent. The regulation that Dispensers may be selected from the ranks of the regular army, and examined by a Board the nature and constitution of which are not defined, would not of necessity differ from the present arrangement; for, supposing the Board to consist of the medical officers of the regiment, they would naturally endorse their own previous selection by confirming the appointment of the parties already officiating.

It should be the object of any new regulation to ensure, as far as may be found practicable, uniformity of education in the persons employed to dispense medicines ; and this would be most effectually secured by requiring candidates for the office of Dispenser (unless licentiates of the Apothecaries' Hall, or otherwise medically qualified) to pass the examination of the Pharmaceutical Society. The College of Surgeons is, like the Pharmaceutical Society, a voluntary association, unsupported by any direct Act of Parliament; but the requirement that Army Surgeons shall possess the diploma of the College has the effect of obliging all candidates for such office to qualify themselves and pass the examination. A similar regulation in regard to Pharmacy would oblige candidates for the office of Dispenser to come up for examination to the Board of the Pharmaceutical Society. It is only by such indirect sanction that a society or college established on the voluntary principle for the promotion of education can exercise the desired influence on the parties concerned; and an indefinite regulation, recognizing a variety of Boards, each having its own standard of proficiency, would tend to divert candidates from the regular channel, and thus, instead of promoting, would rather retard the accomplishment of the object for which the Pharmaceutical Society is striving—namely, the introduction of an efficient and uniform standard of qualification for Dispensers of Medicine—civil and military—throughout the kingdom.

THE DENTAL PROFESSION.

Want of space prevents our giving more than a very brief report of the progress of the two dental Societies, but we publish in another part of this number* the names of the Council and officers of each. It is proper to observe, that there is a mutual desire to avoid clashing, or any approach to hostility, between the two Institutions. Both aim at union, harmony, and improvement. A few Members belong to both, forming a circulating medium between the two, like that which united the Siamese twins, and as long as they pull in the same direction, there will be no tendency to rupture, the balance being preserved by specific gravity on one side and bulk on the other. The aim of the Odontological Society is to be very select and strictly professional in every sense of the term. The College is more extended in its views and operations, but also has its standard of professional respectability.

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* Page 390.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PHARMACOPŒIA COMMITTEE.

The Committee having had under consideration some of the suggestions which have been made for the introduction into the Pharmacopœia of preparations not hitherto noticed therein, wish to elicit further information from Members of the Society respecting the undermentioned substances, with the view of ascertaining whether the extent to which they are used or required in medicine is such as to render their introduction into the Pharmacopœia desirable, and of obtaining any practical remarks on their preparation that those who have directed attention to the subject may be disposed to offer:—

Liquor Opii Sedativus; Liquor Taraxaci; Liquor Vesicatorius, or Blistering Fluid, for causing speedy vesication without much pain; Ammoniæ Benzoas; Ammoniæ Phosphas; Ferri et Quinæ Citras; Iron Alum; Jalapin, or Purified Resin of Jalap.

Communications on these subjects are requested to be addressed to,

T. Redwood,
Secretary to the Committee.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES (*continued*).

Elected in December.

MEMBERS.

Carmarthen	Phillips, William Thomas
Hampstead	Reilly, William Charles
Liverpool	Fairbarn, George
London	Hanbury, Daniel

MAJOR EXAMINATION.

Brewer, John William N. T. ....Okehampton

MINOR EXAMINATIONS.

Allingham, Geo. Samuel	London
Atherton, John Henry	Liverpool
Dakin, John	Chester
Eyre, Joshua James	Manchester
Featherston, John Peter	London
Gill, Hugh	Selby
Nosworthy, Robert	Exeter
Patterson, Douglas John	Nottingham
Pearson, Edward Smith	Liverpool
Rowell, Charles Frederick	Uppingham
Serpell, Samuel	Truro
Scholefield, Arthur	Basingstoke
Smeeton, William	Ironbridge
Weston, Charles	Sleaford

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH	TOWNS.
Brayshay, Thomas	Mr. Brayshay	Stockton
Brooks, Samuel B.	Mr. Lawton	Wakefield
Cortis, Edward	Mr. Cortis	Worthing
Hall, Thomas H.	Mr. Hall	Southampton
Holland, William	Mr. Sibary	Longton
Miller, Duncan S.	Mr. Pooley	Bath
Morley, George	Mr. Wheeler	London
Monger, Hamilton S.	Mr. Gay	Stroud
Roberts, John L.	Mr. Sibary	Longton
Slater, Thomas	Mr. Pilley	Boston
Thomson, Denzil	Mr. Witherington	Worcester
Towerzey, Alfred	Mr. Towerzey	London

CONVERSAZIONE.

The first Conversazione for the season was held in Bloomsbury Square, on Wednesday, the 3rd of December—a period much earlier than that at which these meetings have usually been commenced. The month of December, both as regards the London season and the uncertainty of the weather, is not generally a favourable time for getting a large meeting; and, on this occasion, the weather proved unusually bad. The attendance, however, was as numerous as that of any previous meeting of the sort, and the rooms were well filled throughout the evening. We were glad to observe a larger number than usual of the Associates of the Society present, a circumstance which manifests an increased interest on the part of this class in the objects of the Institution.

In addition to the large and daily increasing collection of specimens belonging to the Society, for which the means of exhibition are already become too limited in the premises at present occupied for that purpose, the Council were, as usual, indebted to many of their friends for numerous objects of interest, which were distributed through the reception-rooms. Among the objects thus contributed were the following:—

Specimens of bark, wood, &c., illustrating the source from which the red cinchona bark of commerce is derived; also specimens of quinidine and cinchonidine, from Mr. J. E. Howard.

Specimens of coffee from different parts of the West of Africa, illustrating the coffee plant, the fruit attached to the tree, and the seed as used, from Dr. Daniell.

A very fine specimen of caffeine, also a piece of the electric telegraph cable to be used across the Atlantic, and a gas furnace, from Mr. W. Squire.

Specimens of Indian fibres, derived from different vegetable sources, including the stem of the plantain, and illustrations of some of the applications of these fibres, from Mr. J. B. Sharp.

Two very beautiful groups of skeleton plants, selected from the Materia Medica, from Mrs. Lonsdale.

Models illustrating crystallography, and having for their object the simplification of the study of this science, which were explained to those interested in the subject by the Rev. Mr. Mitchell, of St. Bartholomew's Hospital.

A series of models, very beautifully made of wire and glass, illustrating the systems of crystalline forms, by Mr. Larkin.

A glass case, containing a collection of humming-birds, from Mr. Gould.

A collection of chemical and surgical apparatus, constructed of vulcanite or hardened Indian-rubber, from Mr. Goodyear.

A stuffed specimen of the aptyrix, or wingless bird of New Zealand, together with a large number of plants from the same locality.

Specimens of iron made by Mr. Bessemer's patented process.

A specimen of Grimwade's desiccated milk, prepared by a patented process, and intended for use in sea voyages, or when fresh milk cannot be obtained. This preparation is in the form of a powder, which, on being mixed with boiling water, forms an excellent substitute for fresh cow's milk. It was repeatedly tried in the course of the evening, and generally approved. From Messrs. Crosse and Blackwell.

Specimens of chemical compounds intended for administration in medicine, preserved in glycerine. The preparations exhibited were, iodide of iron, bromide of iron, hydriodate of quinine, iodide of iron and quinine, respectively dissolved in glycerine, from Mr. Barnes.

Wilson's oil bottles, from Mr. Toogood.

Robiquet's potash and zinc caustics with gutta percha, from Mr. Wood, of Brighton.

Specimens of ceratum cucumis, citrate of magnesia lemonade, and pepsine, from Mr. Hopley.

A collection of minerals from Mr. Tennant.

A galvanic belt, and induction machine, with a battery, called the atmospheric battery, which retains its power, without being recharged, for many months, from Mr. Piggott.

A patent glass ventilator and improved glass aviary, from Messrs. Powell and Sons.

An apparatus for illustrating the laws of friction, and an improved pyrometer, from Messrs. Elliot Brothers.

Optical apparatus, from Messrs. Webster and Carpenter.

New minimum and maximum thermometers, an extremely delicate glass hydrometer, and a new stereoscope, from Messrs. Negretti and Zambra.

An apparatus for illustrating the rotation of the moon, from Mr. Appold.

An improved Ruhmkoff's induction coil, from Mr. C. A. Bentley. Some very striking effects were obtained with this apparatus throughout the evening, which attracted the attention of the greater part of the company. The improvements in the coil are, we presume, similar to those described by Mr. Hearder, and which consist in effecting more complete insulation of the wire than had previously been accomplished. We are informed that the apparatus exhibited was made by Mr. Bentley, who is an amateur experimenter, before Mr. Hearder's improvement had been made public.

Deville's forge lamp for producing a high temperature by directing a current of air under pressure into the flame of a lamp, and an improved gas combustion furnace for organic analysis, both of which were shown in operation, by Dr. B. H. Paul.

A sea-water aquarium containing artificial sea-water, from Mr. Hains.

Several specimens of ornamental stone and china ware, from Mr. Sharpus.

A working model of a sugar-cane and herb-crushing mill, and of the apparatus for the new process of evaporation; also the Esculapian still, the patent self-acting glass boiler safety-guage, and self-acting syphons; from Mr. J. A. Coffey.

In addition to the foregoing, the tables were well supplied with microscopes, from Messrs. Smith and Beck, Mr. Ladd, and the Society of Arts, who sent one of their cheap prize microscopes. Messrs. Parkes and Son, of Birmingham, also sent some of their educational series of microscope objects, which they are getting up to supply at a low charge.

There were also a large number of photographic pictures and stereoscopes, which would alone have formed a good exhibition. These were supplied by Mr. Hughes, Mr. Williams, Messrs. Hahnemann, Mr. Mayall, Messrs. Maull and Polyblank, Mr. Greenish, Messrs. Murray and Heath, Messrs. Geo. Knight and Co., Messrs. Smith and Beck, and Mr. Wm. Squire.

PHYTOLOGICAL CLUB.

17, *Bloomsbury Square.*

ON THE CIRCULATION OF SAP.

BY MR. GRUNDY.

In this communication, which was read at the meeting in November, the author briefly described the view hitherto adopted with regard to the circulation of sap, and gave the following summary of the arguments advanced in its support:—

First, that the presence of alkaloids and other compounds in the bark, prove the passage, by that channel, of elaborated sap from the leaves; it being assumed, that before the sap has reached the leaves, and there undergone assimilation, it is incapable of nourishing the plant.

Secondly, that if a ring of bark be removed from a tree, the growth above the section proceeds with increased vigour, whereas, below the wound, the growth, as it were, stands still, the stem does not increase in size; and, in the potato, according to Mohl, no tubers are formed.

Thirdly and lastly, if the wood be removed, the greatest care being taken to avoid injuring the bark, the portion of the plant above the wound dries up and dies.

The author considered that barks, generally speaking, were not richer in alkaloids, and other peculiar secretions, than the seeds, leaves, roots, &c. He showed that from eighty plants in the Pharmacopœia, the bark of fourteen only was officinal, and that only one of these yielded an officinal alkaloid. He considered the fact of seeds, which are not green, containing active secretions, as evidence that elaborated sap is not required for these compounds; descending sap being unable to reach the terminal portions of a plant. He thought that whatever view might be taken of sap movement, it should be applicable to all classes of plants, whereas the present view only applies to dicotyledons.

He considered endosmose to be the cause of absorption of fluid by the roots, and its distribution throughout the plant; that the sap travels through all cells in an upward direction, more rapidly, and chiefly through the elongated cells, the rapidity being in inverse proportion to the thickness of their walls; and that the sap appears to move most readily in an axial direction, thus: the sap in the wood cells moves upward through them, that in the parenchyma cells through them, &c.; the lateral communication between different tissues bearing a very small proportion to the perpendicular current. At the extreme points, and in green stems furnished with stomata, the lateral communication proportionately increases. There is no general descent of the sap.

The author thus explains the phenomena observed on removing the ring of bark.

It is impossible to remove the bark without at the same time destroying the delicate cambium tissue. The continuity of this tissue being broken, no power remains to cause a movement of the sap in the cambium layer below the wound. Above it, however, the evaporation from the leaves remaining the same, the upper cambium is rapidly drained of its fluids, and supplies itself laterally from the neighbouring wood cells. If an equal amount of sap be supplied to the branch as before, it follows that the lower cambium, assimilating none, the upper cambium will, in addition to its own share, receive that which would in ordinary circumstances be received by the lower, and would thus develop more wood.

The Annual General Meeting of the Club will be held on January 9th, 1857.

PHARMACEUTICAL SOCIETY,

NORTH BRITISH BRANCH.

A MEETING of the Pharmaceutical Society was held in the Rooms, 50, George Street, Edinburgh, on Friday evening, the 12th current, at nine o'clock. Mr. Young occupied the chair.

After a few remarks by the Chairman on the removal of the Society's rooms from Princes Street to the present place of meeting, the following lecture was delivered by Dr. S. MACADAM:—

ON THE MANUFACTURE OF IRON,

with special reference to the recently patented process of BESSEMER.

In introducing the subject, Dr. Macadam described at length the ordinary method of manufacturing the ironstone, or rude ore, into pig iron, showing the chemical changes which occur during the processes of roasting and smelting. He stated, that it was after the pig iron had been obtained, that the new process branched off from that generally followed. The commercial pig iron, as obtained from the blast furnaces, generally contains from ninety-five to ninety-seven per cent. of pure iron—the remaining three to five per cent. being chiefly made up of carbon or charcoal, together with a small proportion of sulphur, phosphorus, and silicon. Before the iron can be useful as bar or malleable iron, it is necessary that these impurities be got rid of. In order to do so, the crude pig iron, by the common process, is first placed in what is termed the "finery furnace," where it is remelted, and a certain portion of the carbon burned away. The fused metal having been run into shallow troughs, is, on cooling, broken up into suitable pieces, and subjected to a further operation, called "puddling," in a reverberatory furnace, where it is stirred or agitated for six to eight hours, and being subjected during this period to the action of the heated air from the furnace, the various impurities undergo oxidation;

the carbon and sulphur being converted into carbonic acid and sulphurous acid, whilst the phosphorus and silicon, forming phosphoric acid and silicic acid, are separated in the slag.

He then proceeded to describe the method by which Bessemer proposed to expedite this tedious mode of purification. In order that the various furnaces at present in operation might be made available, Bessemer first suggested that the molten metal should be run from the blast furnace into a suitable ladle of plate iron, lined with loam or clay, and, whilst in a molten condition, a fire-clay tube inserted, by means of which, a powerful stream of air could be forced through. The metal is thereafter transferred to a reverberatory furnace, provided with a number of openings at its lower part, for the insertion of fire-clay tubes, through which air could be forced into the metal, and thus burn away the impurities in a much more rapid manner than when, as in the old process, only a limited supply of air comes in contact with the upper surface of the metal.

By a more recent patent, Bessemer proposes to refine the crude iron by a single process, which necessitates the employment of a black lead or fire-clay crucible, capable of containing (when three-fourths full) seven cwt. of the molten metal. Matters are so arranged, that this crucible may be surrounded by a quantity of burning fuel, which assists in maintaining the iron in a fused condition, whilst the impurities are being removed. The operation is completed in about half an hour, when the crucible contains iron in a nearly pure condition. Occasionally Bessemer introduces steam as well as air in the early part of the process, which, becoming decomposed, favours the removal of the carbon and sulphur. Although much time and fuel are saved by the new method, Dr. Macadam showed experimentally, that the brilliant scintillations referred to by Bessemer, as being emitted in such abundance during the operation, indicated a great loss of the metal itself, and that this circumstance must therefore form a serious objection to its employment. Another and important defect in the process was, that for some unexplained cause, Bessemer's iron, although almost entirely free from carbon, yet retained by far the greater proportion of the phosphorus originally present in the crude metal, and unless this impurity be removed, the iron will be comparatively worthless, from the property this element possesses of rendering the metal very brittle, and therefore impairing its malleability. Dr. Macadam further stated that the principle of Bessemer's process was certainly not new, and that the particular mode of its application was in many respects identical with that adopted by Martien. With respect to the principle itself, there was no doubt it was correct, and such being the case, it came to be a matter of consideration, whether or not it was commercially practicable, that is to say, whether, allowing that some modification be adopted, whereby the phosphorus may be more effectually removed, the saving in time and fuel will compensate for the loss of iron in the process of Bessemer as it at present stands; or if this be not found to be the case, whether the amount of air cannot be so regulated as simply to burn away the impurities, without seriously injuring the more valuable metal.

In conclusion, he pointed out that Mr. Bessemer had at least taken a step in the right direction, and he deserved our thanks for having stimulated inquiry on a subject where there was great room for improvement. The present method of refining iron was notoriously primitive in its operation, and now that the subject was fairly taken up, there is no doubt but the same principle carried out further in the hands of Bessemer or some other party, would lead to results of the very greatest commercial importance.

Besides performing numerous experiments relating to the subject, Dr. Macadam exhibited specimens of iron purified by Bessemer's process, and by means of diagrams illustrated the different forms of furnaces, &c., described in Bessemer's specification.

Mr. John Mackay then read the following communication on a new and rapid mode of making some of the infusions of the Pharmacopœia. He commenced by making some remarks upon the

NAPIEREAN MACHINE,

recently introduced in Glasgow for the manufacture of Coffee for domestic use. He put one of these machines (which are made of glass) in operation, and explained the whole arrangement to consist in obtaining a vacuum in the large globe by boiling a small quantity of water. By the production of steam the air is expelled, and when the source of heat is withdrawn, this steam is in its turn got rid of by the condensation produced from the action of the external air on the vessel. This being done, the infused coffee is forced through the drainer by the pressure of the atmosphere.

Mr. J. M. stated it had often occurred to him that some advantage might be taken of this principle in making an apparatus likely to be useful to the dispensing chemist for the rapid production of some of the infusions in the Pharmacopœia, and he now laid before the meeting the result of one or two experiments he had made on this subject. The working model of the new Vacuum Infuser, as it might be called, consisted simply of a circular tin vessel, the mouth of which was closed by a large bung, having in its centre an orifice sufficiently large to admit the extremity of a tube or curved siphon, tight enough to prevent the escape of steam or the admission of air, and having its other extremity terminating in a double circular plate of tin or pewter, both surfaces being pierced with small holes. This strainer, he recommended, should be covered with one or two folds of thick muslin or cloth. An infusion being required—say Infusum Rhœi—the ingredients for twenty ounces might be placed in the infusion jug in the ordinary manner, reserving two ounces of the water; and after having allowed the materials to infuse a given time, the tin vessel with the reserved water might be placed on a retort-stand with the curved tube fitted and the perforated extremity immersed in the infusion. A Bunsen lamp being placed beneath the tin vessel, the operation proceeds as formerly described, and the infusion, bright, strong, and ready for immediate use, is forced into the larger vessel, wherein the vacuum had been formed. The whole process may be finished within four minutes. Now, the principal question as to its probable usefulness obviously depends upon the saving in time required to infuse the ingredients; and, in order fairly to show this, he placed on the table a sample of infusion of rhubarb made as directed by the Pharmacopœia by twelve hours maceration, and another made by infusing the same ingredients for only one hour, and passed through this new apparatus. The latter sample was evidently the stronger and better of the two in every respect. He then submitted three samples of infusion of Cinchona bark. The first was made as ordered by the College, but allowing the maceration to be continued only five minutes; the second, the product from the same materials, after standing four hours, and strained in the usual way; and the third made from bark in rough powder, and exhausted in the manner recommended after being infused forty minutes. The first sample was pronounced the best, and the second inferior to both. Infusion of roses, made in ten minutes, was also laid before the meeting.

Mr. J. M., in conclusion, thought the principle now referred to and shown in operation was one well worthy of further consideration, as, in many cases, rapidity of manufacture, with a product free from deposit and ready for immediate use, might be attained. Objections might be made to the manner of producing the vacuum; but, if found to answer the purpose, he thought another equally efficient mode of arriving at this result might be brought into operation, and to which at some future time he might probably draw the attention of the Society. Some manner such as the one now referred to is, he thought, the more desirable, in consequence of the well-founded objection which many medical practitioners and others had to infusions made from concentrated preparations.

After a short discussion, a sample of the fruit of the Locust-tree was laid on the table, and the meeting adjourned.

The Board of Examiners will hold a meeting on Wednesday, 14th January, 1857, at 11 o'clock A.M., in the rooms, 50, George Street, Edinburgh.

Parties intending to present themselves for examination are requested to communicate with the Secretary a week before the day of meeting, and to enclose a statement regarding their previous studies.

Edinburgh, Dec. 20, 1856. JOHN MACKAY, *Secretary.*

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Thursday, 20th November, 1856.

THE PRESIDENT, MR. ABRAHAM, IN THE CHAIR.

Messrs. W. S. Longrigg, T. A. Titherington, W. Dally, J. M. Johnson, W. Carless, and E. Whitehead, were elected Members of the Society.

Donations to the Library and Museum were announced from Messrs. G. Hamilton, T. C. Archer, Hearon, McCulloch and Squire, and E. Buckley.

Mr. H. SUGDEN EVANS read a paper on the

PHARMACEUTICAL HISTORY OF THE WHITE POPPY AND OPIUM.

After describing the cultivation of the white poppy in Europe, and the various products and preparations of the seeds and capsules, he entered into the history of the cultivation and preparation of opium in Asia, and the physical, chemical, and medicinal properties of each kind as imported into this country. He insisted on the importance of selecting only the finest samples of Smyrna opium for all pharmaceutical preparations, and drew special attention to a very spurious kind of opium which, with all the external appearance of fine Turkey opium, and under that name, had recently been largely introduced into the market. It had given rise to great inconvenience, loss, and annoyance, from the fact of its being impossible to obtain a bright and clear solution of it. When used for the preparation of tincture, liquor, or extract, an opaque mucilaginous fluid was the result. Mr. Evans had carefully examined samples of this opium, but found very little pure opium in it, the great bulk of it consisting of an aqueous extract of the poppy mixed with some mucilaginous substance, having all the characters of Bassora gum. When triturated with water or spirit, this mucilaginous substance swells up, and becomes diffused through the fluid, but not dissolved, giving to it great opacity, which no amount of filtering will remove. He had been informed that, in Persia, an opium is prepared for home consumption after the genuine opium had been gathered, by boiling the plants and evaporating the decoction roughly to an extract. This extract is then mixed with a little opium, and well kneaded into balls—gum tragacanth, or any other gum, or even flour, that may be at hand, added to assist in their drying. There can be little doubt that this is the kind of opium which has found its way to this market. Mr. Evans concluded his paper by describing the pharmaceutical preparations of opium and their modes of manufacture.

Thursday, 4th December, 1856.

THE PRESIDENT, MR. ABRAHAM, IN THE CHAIR.

Mr. J. W. Wensley was elected a Member of the Society.

The SECRETARY announced donations to the Library and Museum from Messrs. R. Sumner and Co., J. H. and S. Johnson, J. E. Howard, London, the Museum of Applied Science, and himself.

Dr. NEVINS read a highly instructive paper on "Slow Poisoning by Tartar Emetic," the abstract of which was not received in time for insertion in this number.

Mr. Mercer exhibited Goodall's Patent Grinding and Levigating Machine, which has already been described in the Journal.

Mr. W. H. Samuel exhibited some Photo-galvanographs, and explained the method of their production.

CONVERSAZIONE.

On Thursday evening, the 18th of December, a Conversazione of the Liverpool Chemists' Association was held on the occasion of the formal opening of the MUSEUM OF MATERIA MEDICA AND CHEMISTRY, which occupies a portion of the suite of rooms in the Royal Institution, Colquitt Street. An attractive programme having been in circulation, the attendance, as might have been expected, was numerous, amounting to between 400 and 500, and comprising many ladies and scientific visitors, besides the Members of the Association. The Company began to assemble at six o'clock, and at half-past six, Mr. JOHN ABRAHAM, President of the Association, took the Chair in the Lecture Hall of the Institution.

He said, the Liverpool Chemists' Association had been for some time engaged in the formation of a Museum of Materia Medica, and their design approaching something like a satisfactory form, they thought it was an occasion on which they might endeavour to provide an agreeable evening for the Members and their friends; and having the use of this building, with its varied stores of science, and nature, and art, he hoped it would not disappoint those who had come in the expectation of spending such an evening. The President proceeded to say that he had little to add at present to what was announced in the programme. Some donations had, however, been sent to him, consisting of representations of objects of natural history. They were the production of a French gentleman, and they would be explained to the curious by Mr. Barber, in the small lecture-room. After calling attention to the various objects of interest, the President begged to remind the audience that they had amongst them Mr. Jacob Bell, whose name was exceedingly well known in connexion with improvements in Pharmacy, and by his endeavours to obtain a better education for Pharmaceutists for many years back. As President of the Pharmaceutical Society he had been invited to attend on that occasion, and would favour them with a few observations.

Mr. BELL began his brief address by remarking that he thought he should be able to show them that a few moments devoted to the subject of physic, however distasteful, would not be altogether thrown away, inasmuch as, though uninteresting in one sense, the public interests were concerned in promoting improved qualifications in those who dispensed medicines for the sick. Among the many thousands of persons who travelled from London to Liverpool by railway, not one in a thousand asked himself how was this railway produced—what amount of science, skill, engineering experience, and various appliances, were brought to bear in making this railway. Yet if an accident occurred, if anything went wrong with the machinery, those who suffered inconvenience immediately cried out, "How abominably careless they are—how much better they ought to manage these things." It was precisely the same when persons were taken ill. They send for a doctor, have a prescription written, and then transmit it to a Chemist to be made up. But not one in a thousand considered what amount of skill was necessary in making up the physic. Now, the public had to thank the Members of that Institution for the kindness with which they had united with the Chemists and Druggists of this town in promoting the objects they had in view—a public object. The Chemists, indeed, were glad of the opportunity to go hand in hand with every department of science, knowing, as they did, that there was in science a sympathy which would draw persons together, and elicit the truth. He pointed out the object and advantage of a Museum of Materia Medica as a means of reference for identifying specimens of plants and products, and also for becoming acquainted with the general and chemical characters by which the quality of drugs, &c., might be distinguished. He concluded by alluding to the efforts of the Pharmaceutical Society to improve the education of dispensers of medicine, and the mutual assistance which that Society, with the Liverpool Chemists' Association, were enabled to give to the improvement of the art and science of Pharmacy, an object calculated to confer substantial benefit on the public.

Mr. KNOTT then proceeded to exhibit, by a strong oxyhydrogen light on a screen behind the Chair, some PHOTOGRAPHS of the MOON and SATURN, copied by Mr. Berry, from the results of observations kindly furnished by Mr. Hartnup, of the Liverpool Observatory. These photographs were very interesting, and represented the objects above eight feet in diameter. The Moon was shown in several aspects, partially or entirely illuminated by the Sun; and in one of the views the crater of Copernicus was beautifully shown.

Mr. HAMILTON and Dr. THOMSON offered a few remarks in explanation.

An interval being allowed for refreshment, the company retired to the gallery of paintings, where tea and coffee were served; and where Mr. Knight exhibited a new patent SODA-WATER APPARATUS, which appeared to answer the purpose much to the satisfaction of those who tried its efficacy. The description of the apparatus is deferred until next month.

The following, and other articles of interest, were exhibited in the different rooms:—

A large and interesting collection of Photographs, by Mr. Isaac.

Fresh and salt water Aquaria, by Mr. Edmondson.

A Shekel, Basket made of Aloe Fibre, &c., by Mr. W. H. Samuel.

Natural History Drawings, by Miss Ellison.

Specimens of Submarine Telegraph Cables, including a piece of the proposed Atlantic Cable, by Mr. Mercer.

Stereoscopes, with a large number of Views, by Mr. Chadburn and Mr. H. S. Evans.

Microscopes, with Objects of Interest under View, by Drs. Inman and Edwards; Messrs. Hardman, Salt, Abraham, H. S. Evans, Cundill, Allen, and Mercer.

Goodall's Patent Grinding Machine, by Messrs. J. H. and S. Johnson.

An Electric Clock, by Mr. Atkinson.

Mr. G. R. Berry practically and very successfully illustrated the process of Photographic Printing by Gaslight.

Mr. T. C. Archer very kindly attended during the evening in the Museum of Applied Science, to receive the company.

At half-past eight the company were invited to attend in the Chemists' Museum, which was formally opened by the President, Mr. Abraham, who said it would be expected that he should say a few words on the origin of the Association, and the occasion which had brought them together. The Chemists' Association of Liverpool had been established seven or eight years ago, for the purpose of improving the education of the younger members of the body. The necessity of a museum for such a work had been foreseen from the first, and the Society expected to be provided with a room for the purpose in the general building for the town. That, however, had not been yet available for any purpose except to a limited extent. Through the liberality of the Council of the Royal Institution they had obtained that room, and by their own exertions and the aid of others they had completed it so far as their means allowed. There were many objects still wanting which they ought to have, though they found their friends abounding in liberality, especially the wholesale Chemists. They had expended, on cases alone, £130, of which the London Society had given £50. Mr. Abraham then stated the purposes to which a museum contributed, and mentioned the names of those to whose liberality, in contributing specimens and other objects, they were especially indebted:—Messrs. Evans, Sons, and Co.; John Bell and Co., Oxford Street, London; Messrs. Johnson, Church Street; Mr. Mercer, the Hon. Sec.; Mr. Hanbury, Plough Court, London; Mr. T. C. Archer; Messrs. Sumner and Co., &c. Mr. Davenport, of London, and Mr. Gamble, of St. Helen's, had sent specimens that day. There were, besides, Messrs. Bailey and Wills, Wolverhampton; Messrs. Morson and Co., and Messrs. Raimes and Co. Mr. Abraham concluded by calling on Mr. Bell to say a few words.

Mr. Bell responded by briefly pointing out the distinction between the Museum of the Chemists' Association and that of Applied Science in an adjoining building. He also pointed out the relation between the Pharmaceutical Society of Great Britain and the Liverpool Chemists' Association, and expressed a hope that the latter would by degrees become a branch of the former, having as its Members only Pharmaceutical Chemists, of whom the number was gradually increasing. The two museums—in London and Liverpool—might be mutually serviceable to each other, by the exchange and donation of duplicate specimens.

Mr. H. S. Evans having been called upon, said he had not expected to have occasion to address the meeting; but, in general terms, he expressed his desire to assist the Association so far as it might be in his power. He considered that it was becoming increasingly useful; and had no doubt it would continue to flourish.

Mr. Mercer, the Secretary of the Association, having made a few remarks to a similar effect, the company proceeded at nine o'clock to the lecture-hall, where

Mr. G. Hamilton delivered a short lecture explanatory of the Gyroscope and Rotatory Motion. Having shown the action of several instruments with the combinations of forces acting in different directions, he pointed out the application of some of the principles described to the motions of the planets and satellites in the solar system, and to other phenomena connected with the science of astronomy.

At half-past nine, Dr. Edwards described the chemistry of Bessemer's Process, with illustrative experiments and illuminated diagrams. He explained that he had a large mass of iron, nearly half a cwt., which was forged square, and then rounded under Nasmyth's hammer, turned in a lathe, and polished; and no such mass of soft iron could be got together under the ordinary process. He produced specimens of bar-iron, which possessed the properties of the very best malleable iron. He showed it completely doubled up, folded several times, when heated; and both bent and twisted. Sheets of the metal were next rolled exceedingly thin, thinner than writing-paper; and the chief virtue of the metal was that it would bear tinning at once. Ordinary iron would not take the tin unless it had been prepared by a particular process, and that was called charcoal iron—a very expensive material. Another advantage was the cost, because the entire process and cost of puddling were saved; and another source of economy was, that the loss was 10 or 12 per cent. less than by the ordinary process. Lastly, the purest of all iron was produced—an iron which had the strength and the finish of steel, and at the same time the softness of wrought iron. Dr. Edwards then went on to describe the ordinary process of reducing iron from its ore to a condition of pig iron, and afterwards malleable iron. Mr. Bessemer's process began at the condition of pig iron, and then it was transformed by a most simple apparatus. The pig iron was melted, poured into a hot clay furnace, and cold air was then forced into it. The coal of the iron was oxidized, the mass swelled and scintillated, and slag was projected off the surface, the silica and other impurities burnt off with the carbon, and iron was thus obtained within one per cent. of purity. This process Dr. Edwards first described by means of diagrams, and then illustrated by a number of chemical experiments. He also imitated on a small scale, but in a most perfect manner, Mr. Bessemer's process.

This concluded the amusement and instruction of the evening, and the assemblage shortly afterwards separated.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The second meeting of the session was held in the Royal Institution, on Thursday, December 6th,

MR. W. S. BROWN, VICE-PRESIDENT, IN THE CHAIR.

Mr. Grindon, the lecturer on botany, reported the result of the examination for prizes at the termination of the course. He had been much pleased by the attention and general good conduct of the class; the answers to the questions had been very good indeed, and he had had considerable difficulty in deciding between the first three, their answers having been very nearly equal, but, after careful consideration, he had awarded the prize to Mr. G. S. Kenyon, Mr. G. Wilkinson having the second place, and Mr. W. Stokoe the third, both of whom he thought deserving of Certificates of Merit.

The prize was then presented to Mr. Kenyon, who expressed his gratification at having found himself the successful candidate, and thanked the Committee for having placed such valuable means of instruction within his reach.

Mr. Stone, the lecturer on chemistry, being unavoidably absent, a letter from him was read by the Chairman, stating, that at the examination of the Chemical Class, he had awarded the prize to Mr. G. Wilkinson, which was consequently presented to him.

The prizes were, in the Botanical Class, Wilkinson's *Human Body, and its Connexion with Man;* and for the Chemical Class, Fresenius's *Chemical Analysis* (quantitative); and a *Memoir of Dalton*, by Dr. Angus Smith, the latter book being due to the liberality of Mr. Standring.

The meeting was indebted to Mr. Woolley for a large specimen of paraffine, and one of pitch from the residual products in the manufacture of acetic acid. He also showed a specimen of liquid caoutchouc, which had preserved its fluidity by the addition of a small quantity of ammonia to the juice when recently exuded.

At the next meeting, on the 5th of February, the collection of East Indian drugs in the exhibition at the Mechanics' Institution will be shown, and a descriptive paper read by Mr. Woolley.

ORIGINAL AND EXTRACTED ARTICLES.

ON DECOLOURIZING CHARCOALS, AND THEIR POWER OF ABSORBING SOME OF THE GASES.

BY JOHN STENHOUSE, LL.D., F.R.S.

The singular property which vegetable charcoal possesses of removing odours and colouring matters from solutions, was first observed by Löwitz towards the close of the last century. In 1811, Professor Figuier, of Montpellier, ascertained that animal charcoal, or bone-black, as it is called, was immensely more efficacious as a decolourizer than any of the ordinary kinds of vegetable charcoal. M. Figuier's discovery was speedily confirmed by numerous other experimenters, and soon afterwards applied to the refining of sugar, for which bone-black has ever since formed one of the most important reagents.

The way, however, in which charcoal acts as a decolourizer, remained involved in considerable obscurity till 1822, when three prize essays on the subject were published by MM. Bussy, Payen, and Desfosses. M. Bussy's memoir was particularly valuable, and threw much light on the subject. Those of Payen and Desfosses, though less systematic and practical than M. Bussy's memoir, agreed with it in its general conclusions. These were chiefly that the decolourizing power of charcoal, though inherent in the charcoal itself, is entirely dependent on its physical state, especially on its extreme porosity and minute state of division. Thus, charcoal which has been strongly heated so as to become hard and lustrous by undergoing a species of fusion, scarcely exhibits any decolourizing power. On the other hand, charcoal, such as bone-black, which contains much saline and earthy matter, such as phosphate of lime, &c., as its particles are prevented from agglutinating, yields a dull non-lustrous material, possessing very considerable decolourizing power. Bussy found also that the distinction which had previously been drawn between vegetable and animal charcoals as decolourizers, was erroneous, and that charcoals, whether of animal or vegetable origin, should be divided into two classes, compact and lustrous, and porous and non-lustrous.

Till of late only two species of decolourizing charcoal have been employed in the arts. First. Bone or ivory black, made by calcining bones in close cylinders till the organic matter they contain is entirely carbonized. This is by far the most common of all the decolourizing charcoals, and is the only one employed in sugar-refining, and for decolourizing similar neutral solutions. It usually contains little more than 10 per cent. of carbon, and about 90 per cent. of phosphate and carbonate of lime. The second species of decolourizing charcoal is the so-called purified animal charcoal, which is made by digesting bone-black in hydrochloric acid, and edulcoration with water till all the lime-salts are removed. Purified animal charcoal, when carefully prepared, may be regarded as nearly pure charcoal, which has a dull lustrous appearance, and is extremely porous, provided that, after purification, it has been dried at a temperature little exceeding 212°. It decolourizes neutral and acid solutions exceedingly well; but, after being heated to redness, its texture becomes compact, and its decolourizing power is almost entirely destroyed. A second process for purified animal charcoal consists in intimately mixing blood or the fleshy parts of animals with pearlashes, and then calcining them in close vessels. The alkaline salt is first washed out with pure water, and then the last traces of the potash and lime-salts are removed by digestion with hydrochloric acid. The purified animal charcoal obtained in this way is even more efficacious than that produced from bone-black. Such, then, was the state of our knowledge in regard to decolourizing charcoals till about eighteen months ago, when I first directed my attention to the matter.

As the cost of purified animal charcoal—about two shillings per pound—is very considerable, I was induced to procure an economical substitute for it, which could also be employed in acid solutions. This I effected by combining alumina with ordinary vegetable charcoal. The following is the process employed. Fifty-four parts of the sulphate of alumina of commerce, which is made by digesting the purest kinds of pipe-clay in pretty concentrated sulphuric acid, and which usually contains about 14 per cent. of alumina, were dissolved in water, and digested with 92½ parts of finely-powdered ordinary wood charcoal. When the charcoal had been thoroughly saturated with the solution of sulphate of alumina, the mass was evaporated to dryness. It was then introduced into covered Hessian crucibles, or large muffles, and was heated to redness till all the water and acid had been dissipated. In this way a decolourizing charcoal was obtained, which, though it still appeared perfectly black, was thoroughly impregnated with anhydrous alumina. When sulphate of alumina and charcoal were employed in these proportions, a decolourizing charcoal was obtained, containing almost exactly seven and a half per cent. of alumina, which is the quantity of alumina which I have found, after various trials, to be the most effective, as it appears to be exactly the amount requisite thoroughly to coat all the cells of the charcoal; for, on increasing the quantity of alumina above seven and a half per cent., the charcoal did not gain any additional decolourizing power; and on diminishing the amount of alumina below seven and a half per cent., the decolourizing power of the charcoal was also diminished. After calcination in the way described, on being again carefully pounded, the aluminized charcoal was ready for use. A more economical method of preparing aluminized charcoal is, instead of employing dried sulphate of alumina to prepare a solution of sulphate of alumina of known strength, by simply digesting calcined pipe-clay in pretty concentrated sulphuric acid. Such an amount of the solution is to be employed as shall impregnate the charcoal with seven and a half per cent. of alumina. In preparing sulphate of alumina, the chief point to be attended to is to employ a clay as free from iron and lime as possible, though the presence of a trace of iron is quite immaterial. A clay containing a considerable quantity of lime may likewise be made available, by previously removing the lime by digestion with hydrochloric acid. The charcoal, which is now produced in large quantity by the destructive distillation of sawdust for pyroligneous acid by Halliday's patent process, being almost a waste product, is exceedingly well adapted for aluminizing.

The aluminized charcoal may be employed to decolourize all acid solutions except those containing much free sulphuric acid; for, after being heated to redness, the alumina becomes so compact, that it is not soluble in any but pretty concentrated sulphuric acid. Aluminized charcoal decolourizes tartaric and citric acids quite as efficiently as either bone-black or washed animal charcoal, *i. e.*, bone-black digested for some time with hydrochloric acid, while it is much cheaper than washed animal charcoal, and does not introduce nearly so much inorganic matter into the tartaric acid mother liquors. The price at which aluminized charcoal can be produced, does not exceed that of bone-black. The only two points required to be attended to, with regard to aluminized charcoal, are to employ it in very fine powder, and to boil it for a few minutes with the olution it is wished to decolourize.

I have repeatedly decolourized solutions of crude tartaric and citric acids with aluminized charcoal, and have invariably found that the aluminized charcoal possessed an equal decolourizing power with washed animal charcoal—the material usually employed by tartaric acid manufacturers. I likewise found that the aluminized charcoal introduced a very small quantity indeed of inorganic matter into the mother liquors, compared with that which always results from the employment of either washed animal charcoal or bone-black, as may be seen by the subjoined experiments. Equal quantities of crude tartaric acid were decolourized with the same amounts of bone-black, washed animal charcoal, and aluminized charcoal. When the resulting solutions were evaporated to dryness, they yielded, on incineration, the following quantities of fixed residue:—

Aluminized charcoal	0.32 per cent.
Ivory black...........................	7.58 " "
Washed ivory black	3.84 " "

It is evident, therefore, that aluminized charcoal is especially well adapted for the decolourizing crude tartaric and citric acids, as it introduces such a very small quantity of inorganic matter into the mother liquors. And, doubtless, it is owing to their employing washed animal charcoal, and sometimes even bone-black, that the tartaric acid manufacturers find their mother liquors so intractable from the large quantity of inorganic salts they contain.

An artificial bone-black may likewise be produced by impregnating powdered wood charcoal with basic phosphate of lime, dissolved in an excess of hydrochloric acid, so as to impregnate the charcoal with seven and a half per cent. of bone earth, instead of eighty per cent. as in ordinary animal charcoal. It is manufactured by a precisely similar process to that already described, the acid and water being driven off by ignition in close vessels. It decolourizes very well, but can only be employed in neutral solutions. It is evident that both aluminized and artificial phosphate of lime charcoals, just described, are merely mordaunted charcoals, which decolourize solely by the bases or mordaunts which they contain.

Besides the aluminized charcoal, I have also prepared an additional substitute for purified animal charcoal, by means of hydrate of lime and a mixture of coal-tar pitch and coal-tar. The following is the process employed for this purpose. I take one pound by weight of coal-tar pitch, and gently heat it in an iron pot till it melts. I then add two pounds of fluid coal-tar, and mix the liquids. Seven pounds of hydrate of lime in very fine powder are next gradually stirred into the mass, which soon becomes thick and pasty. It is then gently roasted, the stirring being continued during the whole time till it is reduced to the state of a very fine powder. The great object of the stirring and roasting being to incorporate the lime with the vegetable matter as intimately as possible. The dark brown powder obtained in this way is then introduced into ordinary covered crucibles or iron retorts, and is ignited, until the whole of the vegetable matter is entirely carbonized. The mixture when cold is then digested with dilute hydrochloric acid, thrown upon a filter, and finally washed with distilled water till everything soluble is removed. In this way an extremely porous, very light, nearly pure charcoal is obtained, which for some purposes, such for instance as decolourizing logwood and similar solutions, is four times as effective as the most carefully prepared purified animal charcoal. It likewise decolourizes impure gallic acid solutions admirably. This charcoal from coal-tar may likewise be prepared with much weaker hydrochloric acid than is required to remove the phosphate of lime from bone-black. Quick-lime in fine powder may likewise be employed instead of hydrate of lime, and also calcined magnesia and the light sub-carbonate of magnesia of the shops, but chalk, even when finely powdered, answers very badly indeed. Instead of coal-tar and coal-tar pitch, some other vegetable substances, such as maize, wheat, and the various kinds of flour, common resin or colophonium, pitch, wood-tar, asphalte, or bitumen, may be employed. When, flour, resin, &c., are intimately mixed with carbonate of potash and calcined in close vessels, very good decolourizing charcoals are obtained, but I was surprised to find that carbonate of soda, either hydrated or dried, did not produce a similar result.

As was first observed by Messrs. Bussy and Payen, I find that every species of decolourizing charcoal acts with varying efficiency on each coloured solution to which it is applied. Thus, for instance, one charcoal decolourizes a solution of indigo better than it does one of logwood, syrup, or tartaric acid, while another charcoal will decolourize a solution of logwood more readily than one of molasses; and so of others.

As the result of this investigation, I think that decolourizing charcoals may be very properly divided into three classes: First, into those which, like the purified and the coal-tar charcoals, above described, may be regarded as merely pure charcoals in an extremely minute state of division, and which decolourize by their porosity alone. Second, into those mordaunted charcoals which, like aluminized charcoal, and artificial phosphate of lime charcoal, decolourize solely by the mordaunts or bases which they contain. Third, into bone-black, which is a composite charcoal, and decolourizes, partly, by the large quantity of phosphate of lime, and partly by the ten per cent. of minutely divided charcoal which it contains.

The propriety of this classification may be made very plain by a simple experiment. If equal quantities of purified animal or coal-tar charcoal, aluminized charcoal, and bone-black, are boiled in decoctions of logwood till they are saturated with colouring matter, and if they are then thrown upon filters, which are washed with dilute solutions of aqua ammonia, the ammoniacal solution from the aluminized charcoal will be of a straw, yellow colour; that from the bone-black will be somewhat deeper; while those from the purified animal and coal-tar charcoals will be nearly as deep as ink. This evidently shows, that in the case of the aluminized charcoal, the colouring matter was in true chemical combination with the alumina. In the bone-black, this was also partially the case, while in the purified animal charcoal, no true chemical combination had been formed, but the colouring matter was merely retained by the porosity of the charcoal.

I shall conclude this paper by shortly noticing some experiments on the power which the various decolourizing charcoals possess of absorbing three of the gases, viz., ammonia, carbonic, and hydrochloric acids. Their results, which are somewhat anomalous, I have thrown into the subjoined tabular form. A gramme of each charcoal was employed. All the charcoals were decolourizers, except the platinized charcoal, which, as it consists of common wood charcoal, impregnated with a small quantity of metallic platinum, of course possesses no affinity for colouring matters.

Cubic centimetres of Gases absorbed by one gramme of various kinds of Charcoal.

NAME OF CHARCOAL.	NAME OF GAS.		
	Ammonia.	Carbonic acid.	Hydrochloric acid.
Common Wood	145	15	158.7
Common Animal	105	2.5	Not tried.
Purified Animal	210	No absorption.	185
7½ per cent. Aluminized	212.5	12.5	177.5
7½ per cent. Phosphate of Lime	152.5	10	Not tried.
Pure Coal-tar Charcoal	335	No absorption.	130
5 per cent. Platinized	142.5	No absorption.	185

In connexion with the absorbent power of charcoal for gases, I may mention that the charcoal air-filters, respirators, and bandages for putrid wounds, described by me in a former paper nearly three years ago, are now coming into very general use.

Saint Bartholomew's Hospital, Dec. 6th, 1856.

SOME OBSERVATIONS ON THE COPALS OF WESTERN AFRICA.

BY W. F. DANIELL, M.D., F.L.S.,
Honorary Member of the Pharmaceutical Society.

It is somewhat remarkable that the source of the Guinea copals should have remained so long unknown. Although a large export trade has been carried on for several centuries from many of our colonial possessions, and from a vast extent of country, the subject has hitherto been enveloped in profound obscurity. Our information up to the present time is very meagre and indefinite, both with reference to the trees that produce them, and the localities in which they abound. Our knowledge of these lucrative products is merely limited to the evidence of their direct importation from some of the ports of West Africa. A thorough acquaintance however, with the characteristic qualities, distinctions, and commercial value, can only be gained from practical experience, resulting from the selection of those best adapted for the home markets. A due appreciation of the local varieties, and a detection of the manifold adulterations that occur, will therefore be best obtained by those who frequent the African coasts. This information, when thus acquired, is for obvious reasons, seldom or never promulgated by mercantile communities. Moreover, when we take into consideration that the maritime regions where these resins exist, lie widely apart, and that it rarely falls to the lot of a single individual to visit all, in the course of his career, we may, to a great extent, account for our ignorance respecting their origin and mode of attainment. The history of these substances must, therefore, be brief and imperfect.

The other copals of commerce are comparatively scanty in number. They are procured from different quarters of the globe, and have generally been designated by the title of the continent, or country, from whence exported. They may be conveniently arranged into three groups, viz. :—

a. *East Indian.*
b. *American.*
c. *African.*

According to Hayne, the *Trachylobium Hornemannianum*, Hayne; (*Hymenæa verrucosa*, Lam.) supplies most of the first group, to which some writers also add the *Elaeocarpus copalliferus*, Retz.: (*Vateria Indica* Lin.) and other *Animé*-bearing trees.

The second group has been subdivided into Mexican and Brazilian, or North and South American. The majority are from an equivocal source. They are stated to be yielded by certain species of *Icica*, *Elaphrium copalliferum*, D. C.; *E. excelsum*, H. B. K.; *Rhus copallinum*, L.; *Trachylobium Martianum*, Hayne; *Vouapa phaselocarpa*, Hayne, and other species of *Trachylobium* or *Hymenæa*.

The third group may also be subdivided into the East African or Madagascar, asserted to be chiefly produced by the *Hymenæa verrucosa*, Lam., or *Trachylobium Mossambicense, Klotzsch?;* and the West African or Guinea copals, the latter being partly furnished by the *Guibourtia copallifera*, Benn., and other allied species.

These resinous excretions have, by commercial authorities, been separated into two classes, viz., the hard or true, and the soft or false copals, the latter being what are termed *Gum Animés*. They are often intermixed and confounded one with the other. Monardus, Clusius, Dale, Miller, Geoffroy, Pomet, Lewis, Alston, and numerous other authors have entered more or less, into a descriptive account of their uses and properties. The best, and by far the most correct history of the several kinds in common vogue, have been published by M. Guibourt in his *Histoire des Drogues.** He distinguishes them into *animé dure*

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* Ed. 4, vol. iii., p. 423, 1850.

orientale, the "*copal dur du commerce Français;*" *animé tendre orientale,* and *animé tendre d'Amerique.* His researches into their constitution and qualities, embrace a series of interesting experiments in elucidation of their special characteristics. In his work, no mention is made of those kindred productions so abundant in Western Africa.

Copals have been analyzed by Unverdorben and Berzelius, Filhol,[*] Thomson, Kane, Ure, and others. The first of these Chemists detected no less than five distinct resins in the East African species. Ure states that their ultimate constituents are—

Carbon	79.89
Hydrogen	9.00
Oxygen	11.1

He likewise observes that their specific gravity varies from 1.059 to 1.071, being intermediate in density between the two kindred resins—*Animé* and *Amber.*[†] Other authorities assert that their specific gravity differs from 1.045 to 1.139. By Kane's analysis, the relative constituents are of—

Copal resin	$C_{40} H_{31} O_3$
Fossil copal	$C_{40} H_{32} O$
Animé resin	$C_{40} H_{33} O$

These and other similar products have been considered by Johnston to be derived from oils having a turpentine constitution.[‡]

Copal was formerly officinal, and included among the *Medicamenta Simplicia* of the Edinburgh Pharmacopœia for 1722, 1735, 1744, and 1756, but expunged in those of a subsequent date. It was supposed to possess anodyne and discutient properties, and entered into the composition of plasters and ointments for the relief of paralysis, rheumatism, contusions, &c.[§] Sick wards and diseased persons were sometimes fumigated by the smoke engendered from its combustion.

The copals of Guinea constitute a more comprehensive series than have hitherto been considered. They are to be met with, more or less, in those mountain regions that skirt the lowlands of the coast, commencing from the river Gambia in lat. 13° N., and terminating at Mossamedes, a Portuguese settlement in lat. 15° S. of the equator. They have also been noticed in many countries of Soudan, and have been brought down the Niger from more remote places inland. Differences in their physical characters are sufficiently marked to lead to the identification of the species, and the regions from which they are procured. The variations of color are too numerous to afford any basis for recognition, since they change from white or yellow, to pale green, greenish-yellow, lemon, orange, red, and brown. No authentic data at present exist, in pharmaceutical or chemical works, relative either to their source or amount of production, with the exception of a brief allusion to some kind discovered on the sands in the vicinity of rivers. As one of the staple articles of traffic from equinoctial Africa, large quantities have for years been imported into England, where they still meet with a ready sale. The price of these resins fluctuated from two to four shillings and sixpence per pound, prior to 1815, but after the conclusion of the war, fell to one or two shillings per pound. The rate at later periods advances from fourpence to one shilling per pound, and more, when any scarcity exists in the markets. The duty imposed on their importation was considerably modified at different intervals. In 1833 it was fixed at six shillings

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[*] *From Pharmaceutisches Central Blatt,* in *Pharm. Journal,* vol. ii., p. 773.

[†] *Dictionary of Arts,* &c., vol. i., p. 465. Ed. 4, 1855.

[‡] *Elements of Chemistry,* p. 969. 1842.

[§] *Lectures on the Materia Medica,* by Dr. C. Alston, vol. ii., p. 409.

cwt. (3 & 4 Will. IV., c. 56), which, in 1842, was reduced to 1*s.* per
(5 & 6 Vic., c. 47), and in 1845 was finally abolished (8 & 9 Vic., c. 90.)*
ie copals from West Africa may be provisionally divided into two classes,
North and South Guinea.

I. North Guinea Copals.

Sierra Leone and Windward Coast.—The greater part of the copals ex-
ed from Sierra Leone are procured from the Rio Malacourie, Pongas,
ez, and other circumjacent rivers. Some quantity is likewise brought from
Cimneh countries, and a trifling quota is occasionally contributed from the
ntain districts of the colony. A similar kind is said to be abundant in the
uguese colony of Bissao, and it has even been exported from the rivers
manca and Gambia more northward. In quality they are deemed superior
l others on the coast, and are more highly prized on account of their ex-
e hardness and transparency. The character of this resin appears to have
unknown to the English and French voyagers, who frequented this part in
ixteenth and seventeenth centuries, for Ogilby, Villefond, Labat and others,
being aware of its origin, casually mentioned it under the term of ambergris.
ot, who visited Sierra Leone in 1678, fell into a similar error, from the cir-
stance of a few fragments only being found on the beach, and designated it
he same title.† The true nature of this substance was, however shortly after
rtained by the French traders. Mathews, in 1786, remarks that the "tree
h produces the gum copal grows in great abundance on the heights of Sierra
ne."‡ Afzelius, in his report on the natural productions of the colony, in
, furnishes no information further than that "gum copal" was "among the
gums on the coast."§ The Sierra Leone Company, immediately after the
tion of their factories, annually transmitted several cwt. to England, and as
lemand augmented, it ultimately became one of their best exports. These
ls occur in small round tears, or irregular conical and smooth nodulated
es, seldom exceeding in size an ordinary duck egg. They are covered to a
ter or less extent by a peculiar white efflorescence, which increases by age.
ir color graduates from a pale green to a lemon or dull yellow. The
e of these species varies much in the English markets, being in a great
sure dependent on the amount of requisition. The average price has
erly been from £5 to £8 per cwt. In the colonial depôts it is sold at
1 4*d.* to 9*d.* per ℔., but in the neighbouring rivers can be purchased at a
rate.

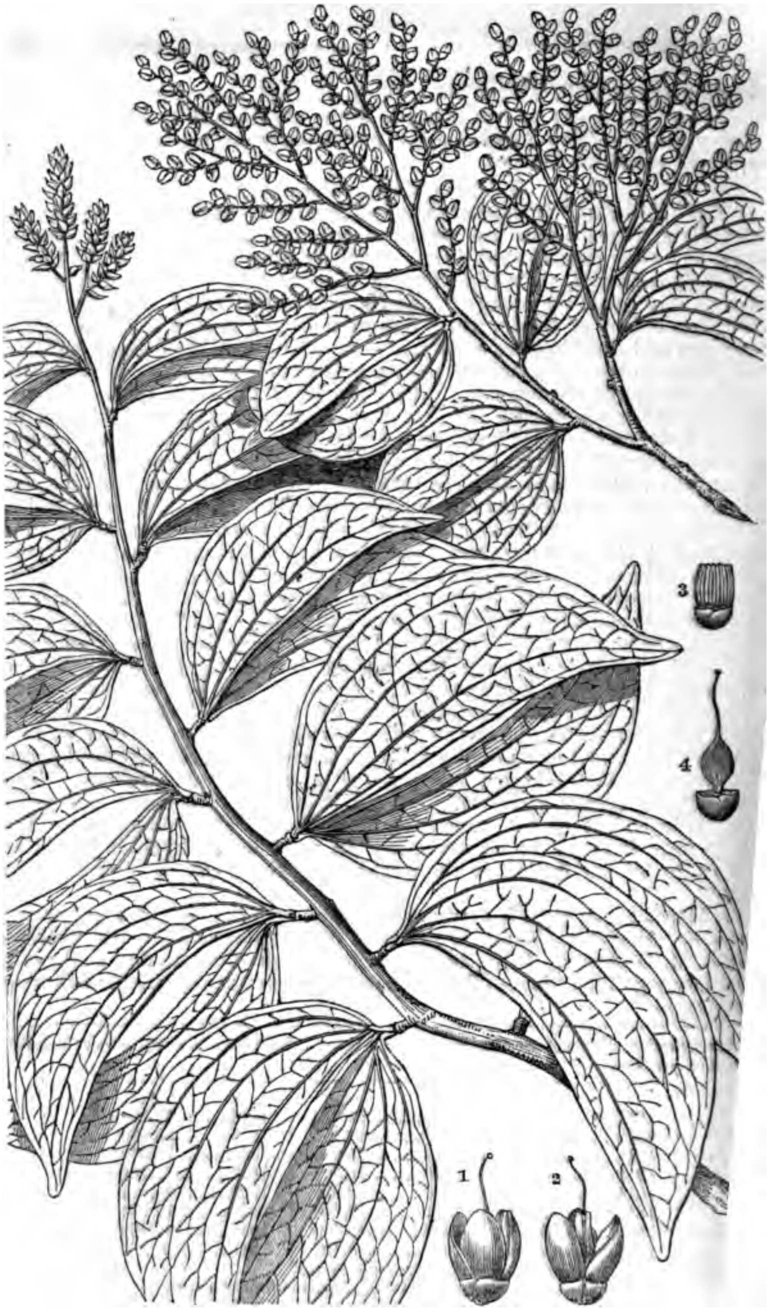
he Sierra Leone copal is a natural exudation from the bark of a tree named
bourtia copallifera, Benn., in honor of the distinguished French Pharma-
gist, M. Guibourt. It has been described by Mr. Bennett, Sec. L. S., at a
nt meeting of the Linnean Society, under the above name, with the following
racters:—

The following table will give the imports into Great Britain from Western Africa for a few
ecutive years:—

	lbs.		lbs.		lbs.
1808-9[a]	34,720	1826	24,084	1834	62,160
1810	8,945	1827	23,408	1835	53,536
1811	5,580	1828	21,952	1836	73,472
1812	3,013	1829	13,552	1837	11,984
1813	...	1830	12,320	1838	20,584
1814[b]	12,261	1831	12,768	1839	16,240
1815	23,791	1832	40,656	1840	29,568
1816	10,210	1833	43,792	1841	22,176

[a] Into London, and partly only for 1809.
[b] Including 2,999 lbs. of *Animé*, reported from Senegal.

A Description of the Coasts of North and South Guinea, lib. ii., chap. ii., p. 102.
A Voyage to the River Sierra Leone, p. 39. 1788.
§ *Report of Sierra Leone Company for* 1794, p. 174.



GUIBOURTIA COPALLIFERÆ. BENN.

1. A flower seen from the side next the axis. 2. Ditto, seen laterally. 3. A flower-b
the sepals removed, showing the unexpanded stamina. 4. A flower, after the falling o
sepals, showing the ovary and style, with the persistent bractex.

Calyx bibracteatus, 4-sepalus; sepalis deciduis. *Corolla* nulla. *Stamina* 10. libera, æqualia. *Ovarium* compressum, pauci-(2-4) ovulatum; stylo filiformi; stigmate obtuso. *Legumen* . . . . . Arbor *Hymeneæ facie.* Folia *bifoliolata; foliolis 3-5 nerviis.* Paniculæ *terminales;* floribus *in ramulis ultimis approximatis, sessilibus, inconspicuis.*

It belongs to the suborder *Cæsalpineæ*, and is very nearly related to *Copaifera*, *Hymenæa*, *Trachylobium*, and *Peltogyne*.

The tree chiefly delights in elevated or mountain localities, generally attains a considerable magnitude, and stands somewhat conspicuous among its forest compeers, by a dark green and luxuriant foliage. Moreover, the bifoliolate leaves and singular inflorescence would alone suffice to distinguish it from the surrounding plants. The flowers expand in August or September, and sometimes later in the dry season. They are produced in terminal panicles, and the numerous buds previously to expansion present a curious aspect, from their white coral-like apices. The fruit is stated to be a legume three or four inches long, containing from two to four seeds. In Goderich and other hilly districts, the vernacular title of the tree and resin is *Kobo*. The wood is white, closely grained, hard, and susceptible of a fine polish, and by the native tribes is used for many economical purposes. Both it and the cortex are endowed with a peculiar odoriferous fragrance, which, however, is dissipated on removal to a colder climate. The young leaves are said to constitute a favourite remedy for the cure of sores and ulcerations, by the Timneh and Sherbro populations. Winterbottom observes that the Bulloms, in the manufacture of earthen pots, during their hot state, throw within each finely-powdered copal, which they rub well around by means of a piece of cloth fastened to the end of a stick, like a mop; and that this process, by preventing the water passing through, answers in lieu of glazing.*

The exudation at first consists of soft white tears, which gradually conjoin into isolated masses, and rapidly indurate upon exposure to the atmosphere. Their white hue imperceptibly passes into the intermediate tints of green, lemon, and finally terminates in yellow. The nodules are mostly effused in a pure and translucent state, but soon become enveloped more or less by a delicate white bloom, similar to that observed on several kinds of plums. The tree, independently of the ordinary copal, affords other inferior sorts, gathered from the trunks and branches of young or immature productions. They appear in smaller fragments of a semi-opaque and dirty yellow or brown, are much softer, and are usually bought to adulterate the finer samples, being otherwise unsaleable. It is not improbable that different species of *Guibourtia* may yield this resin, which, however, at present remain undiscovered.

The copal imported by the coasting vessels into the colony, from the rivers Malacourie, Pongas, &c., is much cleaner than that obtained within the immediate vicinity of Sierra Leone. Considerable quantities, the accumulations of years, are regularly washed down by the heavy currents of the rainy season, from the mountain slopes, in the soil of which they were embedded, and are subsequently gathered in the bed or on the banks of rivers. A moderate quantity is collected from the trees themselves. The natives, with the view of enhancing the value, attempt the removal of white deposits, and other exterior impurities, by the following simple process:—Dried plantain stems, or other succulent trees, are burned into ashes, from which a strong lixivium is made; into this the masses are thrown, and daily agitated, until the outer crust has been softened or dissolved. The appearance, after this purification, is much improved.

A limited amount of copal is also furnished from the Windward Coast, which, I understand, is generally transmitted to America. It differs slightly in quality from the preceding kinds, being less brittle and of less purity, judging from the few samples submitted to my notice.*

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* *An Account of the Native Africans*, vol. i., p. 94.

b. Gold Coast.—The resins said to be derived from this part of the African coast, and formerly exported under the above denomination, were principally procured from Whydah, Porto Novo, and Akkrah. There appear to be several varieties, marked by trifling distinctions, none of which are, however, of sufficient importance to justify their description. The copals from Akkrah comprehend two species, viz., the indigenous and the Slave Coast. The native kind is sold in small roundish irregular masses, covered with dirt and other impurities, and consists of conical conglomerations of nodules, or large tears, of a dull yellow or light brown hue. Though less in magnitude, the masses are not so much enveloped by that peculiar efflorescence, otherwise they resemble, in many respects, the inferior copals of Sierra Leone. They are, however, deficient in the two essential qualifications of commercial value, viz., hardness and brittleness, partaking more of the physical characters of *Animé*, and may, perhaps, constitute the connecting link between it and the ordinary copals. These resinous excretions are considered to be the worst in the market; they are, therefore, seldom held in request, unless for some special purpose. They may, probably, be the produce either of the younger trees or of another species of *Guibourtia*. In 1855, several tons were brought to Sierra Leone for sale, but no purchaser could be found to take them at a value almost nominal. Their price in the English markets ranges from 20*s*. to 35*s*. per cwt.

c. Slave Coast.—These kinds offer a few peculiarities that clearly establish their identification; they belong to that class of copals known under the designation of *coated*. They are met with in the form of narrow, compressed, or spheroidal fragments, studded with irregular projections and longitudinal elevations. They are invariably crusted by a thick chalk-like coat that firmly adheres to the external surface. The color varies from an opaque white to a dull yellow or pale brown. Their exudation apparently takes place in a more liquid state than the others, since ants, and various insects, are not infrequently found enclosed within their internal parieties. Their price in the English market is rather low, being about equal in value with the preceding Akkrah kind.

d. Soudan and Kowara.—The copals submitted for sale in the markets of Egga, and other native towns on the banks of the Kowara, or Niger, are ordinarily of an inferior quality, in a dirty condition, and in several respects resemble the two previous sorts, but are of an intermediate character. They occur in small fragments, and not being much appreciated by the trading portion of the population, are rarely observed. The quantity brought from the circumjacent countries is comparatively trifling, the greater part of the samples being composed of gums and other similar substances. The species found among the Ebo tribes is obtained from Benin and Jaboo, and is usually employed by the women to impart a glossy polish to their massive anclets and other ornaments of ivory. The quality is

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* The subjoined table will exhibit the exports from Sierra Leone for different periods:—

	lbs.				lbs.
1817	125 and 3 casks	weight unknown		1841	9,744
1818	343 and 9 casks			1844	30,975
1819	— 11 casks			1845	6,086
1820	3,388 and 15 punch.			1846	10,103
				1847	15,530
	lbs.		lbs.	1848	47,213
1827	18,928	1834	26,320	1849	3,280
1828	21,280	1835	22,176	1850	21,609
1829	12,544	1836	6,048	1851	18,851
1830	8,512	1837	2,464	1852	25,503
1831	5,488	1838	2,790	1853	71,444
1832	7,064	1839	10,864	1854	135,088
1833	18,816	1840	20,272	1855	157,822

ndifferent. A somewhat rarer kind is, however, to be occasionally met ıt Lagos, and on the upper course of the Niger, brought in minute pieces :he Yorruba and Nufé kingdoms by the regular trading goffles, of a pale or lemon hue, and remarkably pure, hard, and translucent. Unfortu- , the paucity is so great, that a few pounds can only be procured after long als.

other resinous products, indigenous to the regions more under the equator, with propriety, be referred to the succeeding group. Our information ré to their source and supply is extremely obscure.*

(*To be continued.*)

THE SASSY TREE OF WESTERN AFRICA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

DEAR SIR,—In the interesting paper, by Mr. Procter, on the Sassy tree est Africa, which is reprinted in the *Pharmaceutical Journal*, xvi., 233, is an error which I venture to ask you to allow me to correct, there being l in modern Natural History so great as the excessive multiplication of .

Procter says, that "as no specific name has been given to this tree," he it Erythrophleum judiciale. It happens, however, that it had already two ic names, as will be seen upon reference to Hooker's *Niger Flora*, an im- nt systematical work, which all should study who write on the plants of old Coast and neighbouring regions. At p. 329 of the *Niger Flora*, Mr. er will find the following sentence: "1. Erythrophleum Guineense G. *Gard. Dict.* 2, *p.* 424. Fillœa suaveolius, *Guill. et Perr. Fl. Seneg.* 1, p. 55."

m able to state, from an inspection of Mr. Procter's specimens, with a of which you have favoured me, that his plant is identical with *Erythro- m Guineense*, as, indeed, he will see if he turns to Guillemin and Perrottet's good figure of the plant. Therefore the name *judiciale* must be erased works of science.

Yours faithfully,

on Green, Dec. 18, 1856. JOHN LINDLEY.

NOTE ON *WOOD OIL.*

BY J. E. DE VRY, PH.D., ROTTERDAM,

Honorary Member of the Pharmaceutical Society of Great Britain.

ME time ago I received through the kindness of my friend, Mr. Daniel ury, a sample of the *Wood Oil* described by him in the *Pharmaceutical al*, vol. xv., p. 321. The note on the same subject, by M. Guibourt, shed in vol. xvi., p. 322, induces me to communicate some observations I made soon after I was in possession of this drug, which are so far sting, in that they may serve to distinguish this oil from Copaiba Balsam, which it has much analogy.

ood oil, mixed with an equal volume of benzol, forms a turbid mixture,

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mount of copal imported from the countries between the Rio Volta and the Cape of Good in fifteen years:—

	lbs.		lbs.		lbs.
1827	888	1832	27,888	1837	4,704
1828	336	1833	13,216	1838	21,576
1829	888	1834	28,896	1839	4,480
1830	2,248	1835	13,104	1840	5,488
1831	5,376	1836	27,104	1841	3,360

and, after a very long time, a resinous flocculent substanee is deposited; the supernatant solution being a clear, brown liquid.

Copaiba Balsam, treated with an equal volume of benzol, forms a perfectly clear solution.

By distillation of 270 parts of Wood Oil with water, I obtained 170 parts of an almost colourless essential oil, having a specific gravity of 0.928, and a boiling point of 255° C. Observed in the polarizing apparatus of M. Biot, I found it to have a rotation to the left equal to 68.5° ← observed in a tube of 200 millimetres. The molecular rotatory power for 100 mm. is therefore, according to the formula of Biot, $\left([a]=\frac{a^{\circ}}{l\,d\,e}\right)=\frac{68^{\circ}}{2\times0\,928\times1}=36.9^{\circ}$ ←

The rotatory powers of several samples of Copaiba Balsam were the following:—

No. 1. 20.22° →
2. 20.68° →
3. 26.67° →
4. 18.10° ←
5. 17.27° ←
6. 23.05° ←

The samples Nos. 1, 2, and 3, had been collected by Mr. A. J. De Warszewicz in Central America, and were presented to me by my friend Mr. Hanbury.

Both the essential oils of Wood Oil and of Copaiba Balsam became dark red by the action of hydrochloric acid gas. By rectification with water, these coloured essences became colourless. That of Copaiba retained the same rotatory power as before; but that of the Wood Oil was altered, and had now a rotation to the right of 38° observed in a tube of 200 mm. By rectifying the essence of Wood Oil and fractioning the distilled product, I found that the most volatile part had a rotation of 78°, ← and the less volatile, a rotation of 55° ← both observed in the same tube of 200 mm.

The conclusion from these experiments is, that the admixture of Wood Oil with Copaiba Balsam can be detected.

1. By the action of an equal volume of benzol.
2. By the stronger rotation of the essential oil of Wood Oil, and by the fact that this rotation is changed from the left to the right, if the essential oil is treated with hydrochloric acid gas, and afterwards rectified with water.

REPORT OF THE
RESULTS OF PHYSICAL AND CHEMICAL INVESTIGATION,
AND OF THE
APPLICATIONS OF PHYSICS AND CHEMISTRY IN THE ARTS.

BY B. H. PAUL, PH.D., F.C.S.

(*Continued from page* 332.)

Method of Estimating the Density of Solids.—M. Raimondi* weighs the substance in air, then attaches to it a silk thread, and immerses it in a vessel containing water or some suitable liquid, and weighs the whole. He then suspends the substance in the liquid, by attaching the silk thread to a wire support extending over the scale pan in which the vessel of liquid is placed, and observes the weight, P, of liquid displaced by the substance, and from these data calculates the density, Δ, by means of the formula

$$\Delta=D\frac{P}{P'}+\delta$$

in which D represents the density of the liquid used, δ that of air, and P′ the weight of the substance in air.

Law of Absorption for Ammonia.—Prof. Bunsen has shown that the quanof gas absorbed by water is represented by a definite coefficient, dependent upon temperature.

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* *Comptes Rendus*, Aug., 1856.

urther experiments in his laboratory have shown that this is the case with gases t are dissolved in large amount as well as with those which are dissolved only in ll amount.

r. Carius* has determined the coefficients of solubility for ammonia, at different peratures, as follows:—

Temp.	Coeffic.	Diff.	Temp.	Coeffic.	Diff.	Temp.	Coeffic.	Diff.
0° C.	1049.60		9° C.	831.98	20.06	18° C.	682.26	14.59
1 "	1020.78	28.82	10 "	812.76	19.22	19 "	667.99	14.27
2 "	993.26	27.52	11 "	794.32	18.44	20 "	653.99	14.00
3 "	966.98	26.28	12 "	776.60	17.72	21 "	640.19	13.80
4 "	941.88	25.10	13 "	759.55	17.05	22 "	626.54	13.65
5 "	917.90	23.98	14 "	743.11	16.44	23 "	612.98	13.56
6 "	894.99	22.91	15 "	727.22	15.89	24 "	599.46	13.52
7 "	873.09	21.90	16 "	711.82	15.40	25 "	585.94	13.52
8 "	852.14	20.95	17 "	696.85	14.97			

e has also ascertained the relation between the density of solution of ammonia, 7°.2 F., and the per-centage amount of gas it contains, to be as follows:—

ec. av.	p. c. Ammonia.	Spec. Grav.	p. c. Ammonia.	Spec. Grav.	p. c. Ammonia.	Spec. Grav.	p. c. Ammonia.	Spec. Grav.	p. c. Ammonia.	Spec. Grav.	p. c. Ammonia.
344	36.0	0.8976	30.0	0.9133	24.0	0.9314	18.0	0.9520	12.0	0.9749	6.0
348	35.8	0.8981	29.8	0.9139	23.8	0.9321	17.8	0.9527	11.8	0.9757	5.8
352	35.6	0.8986	29.6	0.9145	23.6	0.9327	17.6	0.9534	11.6	0.9765	5.6
356	35.4	0.8991	29.4	0.9150	23.4	0.9333	17.4	0.9542	11.4	0.9773	5.4
360	35.2	0.8996	29.2	0.9156	23.2	0.9340	17.2	0.9549	11.2	0.9781	5.2
364	35.0	0.9001	29.0	0.9162	23.0	0.9347	17.0	0.9556	11.0	0.9790	5.0
368	34.8	0.9006	28.8	0.9168	22.8	0.9353	16.8	0.9563	10.8	0.9799	4.8
372	34.6	0.9011	28.6	0.9174	22.6	0.9360	16.6	0.9571	10.6	0.9807	4.6
377	34.4	0.9016	28.4	0.9180	22.4	0.9366	16.4	0.9578	10.4	0.9815	4.4
381	34.2	0.9021	28.2	0.9185	22.2	0.9373	16.2	0.9586	10.2	0.9823	4.2
385	34.0	0.9026	28.0	0.9191	22.0	0.9380	16.0	0.9593	10.0	0.9831	4.0
389	33.8	0.9031	27.8	0.9197	21.8	0.9386	15.8	0.9601	9.8	0.9839	3.8
894	33.6	0.9036	27.6	0.9203	21.6	0.9393	15.6	0.9608	9.6	0.9847	3.6
898	33.4	0.9041	27.4	0.9209	21.4	0.9400	15.4	0.9616	9.4	0.9855	3.4
903	33.2	0.9047	27.2	0.9215	21.2	0.9407	15.2	0.9623	9.2	0.9863	3.2
907	33.0	0.9052	27.0	0.9221	21.0	0.9414	15.0	0.9631	9.0	0.9873	3.0
911	32.8	0.9057	26.8	0.9227	20.8	0.9420	14.8	0.9639	8.8	0.9882	2.8
916	32.6	0.9063	26.6	0.9233	20.6	0.9427	14.6	0.9647	8.6	0.9890	2.6
920	32.4	0.9068	26.4	0.9239	20.4	0.9434	14.4	0.9654	8.4	0.9899	2.4
925	32.2	0.9073	26.2	0.9245	20.2	0.9441	14.2	0.9662	8.2	0.9907	2.2
929	32.0	0.9078	26.0	0.9251	20.0	0.9449	14.0	0.9670	8.0	0.9915	2.0
934	31.8	0.9083	25.8	0.9257	19.8	0.9456	13.8	0.9677	7.8	0.9924	1.8
938	31.6	0.9089	25.6	0.9264	19.6	0.9463	13.6	0.9685	7.6	0.9932	1.6
943	31.4	0.9094	25.4	0.9271	19.4	0.9470	13.4	0.9693	7.4	0.9941	1.4
948	31.2	0.9100	25.2	0.9277	19.2	0.9477	13.2	0.9701	7.2	0.9950	1.2
953	31.0	0.9106	25.0	0.9283	19.0	0.9484	13.0	0.9709	7.0	0.9959	1.0
957	30.8	0.9111	24.8	0.9289	18.8	0.9491	12.8	0.9717	6.8	0.9967	0.8
962	30.6	0.9116	24.6	0.9296	18.6	0.9498	12.6	0.9725	6.6	0.9975	0.6
967	30.4	0.9122	24.4	0.9302	18.4	0.9505	12.4	0.9733	6.4	0.9983	0.4
971	30.2	0.9127	24.2	0.9308	18.2	0.9512	12.2	0.9741	6.2	0.9991	0.2

rystalline Form, &c., of Selenium and Iodine.—Prof. Mitscherlich† finds t the form of selenium crystallized from bisulphide of carbon is an oblique mbic prism. At 116° F., bisulphide of carbon dissolves 0.1 per cent. of selenium, l at 52° F., it dissolves 0.016. The selenium separates, on cooling the solution, thin transparent red laminæ with considerable lustre, and as granules that are so rk coloured as to appear almost black. When heated to 212° F., with water, the crystals are not altered in their characters, but when gradually heated to 302° F., they become almost black, and are then quite insoluble in bisulphide of carbon. When the altered crystals are melted, and the mass cooled rapidly, it again dissolves completely in bisulphide of carbon. The density of the crystals before being heated was 4.46 or 4.509 at 59° F., after being heated it was 4.7. The density of selenium crystallized from a solution of selenide of sodium was from 4.760 to 4.788 at 59° F.

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* *Annalen der Chemie und Pharmacie*, xcix., 129.

† *Monatsbericht der Berliner Akademie*, Juni, 1855.

It appears that the selenium crystallized from selenide of sodium and the granular crystalline selenium are identical, and essentially different from that crystallized from bisulphide of carbon. In this respect selenium is analogous to sulphur, which also exists in two isomeric states, but selenium has a much greater stability in its isomeric states.

The crystals of iodine obtained in various ways have always the same form, and do not present any of the peculiarities observed in sulphur, selenium, and phosphorus. The crystal form is a rhombic octohedron.

The crystal form of phosphorus is a regular dodecahedron.

Very fine crystals of phosphorus may be obtained by exposing phosphorus to sunlight in a tube either exhausted, or filled with a gas which cannot oxidize it. Prof. Mitscherlich states that he has never observed the emission of light from phosphorus during volatilization when oxidizing substances were excluded, so that the emission of light would seem to be essentially connected with oxidation. The crystals of sublimed phosphorus soon acquire a red colour in sunlight, without alteration of form, but generally it is only the outside that is altered, and the change does not consist in the production of the isomeric phosphorus discovered by Schrötter.

Action of Water upon Glass.—Professor Pelouze* has made some experiments on the decomposition of glass by water. He finds, that while glass vessels in which water is boiled are but very slowly attacked, powdered glass is decomposed with remarkable ease. Thus a pint glass flask, in which water was boiled for five days, lost scarcely a decigramm, but when the neck of this flask was powdered and boiled for the same time with water, the decomposition extended to as much as one third of the mass. Two specimens of glass, having the following composition—

Silica	72.1	77.3
Soda	12.4	16.3
Lime	15.5	6.4
Alumina Peroxide of iron	traces	traces

were subjected to the same treatment.

The substance extracted from the first, amounted to 1.5 per cent.; that from the second, to 2 per cent; and, judging from the quantity of lime dissolved, and the amount of this base in the glass, the decomposition amounted in the one instance to 10 per cent., and in the second to 33 per cent.; so that glass in which the amount of lime is large in proportion to that of soda, is less decomposed by water, than glass in which the amount of lime is less than that of soda.

The experiments show that it is chiefly the basic constituents of glass that are extracted by water, and probably they might be entirely separated when the action was continued for a long time.

All ordinary kinds of glass undergo gradual decomposition, when exposed in fine powder to the atmosphere; they absorb carbonic acid, and after a time effervesce copiously.

When a mixture of powdered glass and water is exposed for some days to the air, it effervesces with acids, and the solution always contains sulphuric acid, originating from sulphate of soda, which Prof. Pelouze has found in most kinds of glass to the extent of from 0.001 or 0.002 to 2.0 per cent.

Powdered glass boiled with water, through which a current of carbonic acid is passed, yields a liquid that effervesces copiously with acids. When boiled with solution of sulphate of lime, a considerable amount of sulphate of soda is produced. This reaction accounts for the fact that the walls and floor of the rooms in which plate-glass is polished, are covered with an efflorescence of sulphate of soda. The gypsum used for fixing the plates yields the sulphuric acid, and the glass yields the soda.

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* *Comptes Rendus*, July, 1856. No. 3.

The extent to which powdered glass is decomposed by water is remarkable, when ompared with the great durability of glass vessels under the same condition; and s probably owing to the greater extent of surface offered by the powdered glass to he decomposing influence of the water.

[These results are to a certain extent analogous to, and confirmatory of, those btained by Profs. W. and R. Rogers,[*] and recorded by Prof. Bischof,[†] showing that ven felspar, hornblende, tourmaline, and serpentine, &c., when finely powdered, are ensibly decomposed by water and by solution of carbonic acid.]

Detection of Arsenic and Antimony.—Dr. Odling has ascertained that $\frac{1}{500}$ rain of arsenious acid may be detected with certainty by means of Reinsch's test, nd that the metallic deposit, crystalline sublimate, and yellow sulphide may be btained successively. He gives the preference to fine copper gauze for the precipi-ation of the arsenic, and conducts the sublimation in a hard glass tube, 2 inches ong, $\frac{1}{8}$ inch diameter, sealed at one end, and drawn out at the other end to about an nch, almost capillary. He finds that decisive results are obtained when the dilution mounts to 2,250,000 times the weight of arsenious acid. Protracted ebullition seems o be a necessary condition of the deposition of arsenic, particularly when the uantity is small or the degree of dilution great. It has been urged as an objection o Reinsch's test, that during the ebullition with hydrochloric acid, arsenic is olatilized as chloride; but Dr. Odling does not consider this fact is of any conse-uence in practice, as the loss is inappreciably small, and might be provided against by using a small retort for the operation.

It is generally believed that Reinsch's test is applicable only for the detection of arsenical compounds that are dissolved by dilute hydrochloric acid. In cases of poisoning, it is not unfrequent that the whole of the arsenic is converted, by the decomposition of the tissues, into tersulphide, which is generally represented as being insoluble in dilute hydrochloric acid, and consequently the arsenic would not be extracted from the organic substance and tissues by boiling with dilute hydrochloric acid; however, Dr. Odling has found that the precipitated tersulphide of arsenic is readily dissolved by very dilute hydrochloric acid, and even by boiling water, to a much greater extent than was observed by Dr. Christison.

He finds also that the deposits obtained from arsenic and antimony resemble each other very closely, but that this is not of any consequence in practice, owing to the ease with which the arsenical deposit is distinguished from that produced by arsenic.

With regard to the detection of antimony by means of Reinsch's test, he finds that bismuth, and even tin, will yield metallic deposits which cannot safely be distinguished from that obtained from antimony, by the appearance only.

The characters of the bismuth deposit are somewhat peculiar; when thin it approximates closely in appearance to that obtained with antimony. The deposit obtained with tin differs much according to circumstances; when thin it has a peculiar dotted appearance, sometimes it is almost black, sometimes steel-blue. When heated it sometimes appears to diminish considerably. It would, moreover, be produced only when the amount of metal in solution was so large as not to present any difficulty in detecting it.

Dr. Odling suggests the following as a delicate method of confirming the indication of antimony:—

The coated copper is covered with a solution of one grain permanganate of potash in fifteen ounces of water, a drop or two of potash solution added, and the whole boiled. In a few minutes the permanganate is decomposed, the antimony passes into solution, and may be precipitated by means of sulphuretted hydrogen from the solution acidulated with hydrochloric acid.

Decomposition of Uric Acid in the Animal Organism.—Dr. Neubauer finds[‡] from experiments with rabbits, one fed upon bread, the other upon carrots, that, under normal conditions, uric acid is entirely converted into carbonic acid and urea; and that oxalic acid may be formed when the process of oxidation is restricted, as is the case during sleep, and in pathological conditions.

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[*] *American Journal of Science and Arts*, 1848.

[†] *Elements of Chemical and Physical Geology* (Cavendish Society), i., 58.

[‡] *Annalen der Chemie und Pharmacie*, xcix., 206.

Hydraulic Mortar.—The different varieties of this material may be divided into two classes, according to the chemical processes to which the hardening under water is due, viz., the *Roman cements*, which contain caustic lime when fresh, and the *Portland cements*, which do not contain caustic lime.

Fuchs[*] has satisfactorily shown that the hardening of Roman cement, apart from the production of carbonate of lime, is essentially due to the production of basic silicate of lime ($3\,CaO, 2\,SiO_3$), by the combination of an acid silicate, or of free soluble silica with caustic lime.

The hardening of Portland cement under water, is, on the contrary, due to the decomposition of a silicate consisting of three or four equivalents of base combined with one equivalent of silica with the production of caustic lime and such compounds of lime with silica and with alumina as may be produced in the wet way.

Consequently, the hardened Portland cement contains the same substances as hardened Roman cement, but they are produced in a different way in the hardening by the action of water.

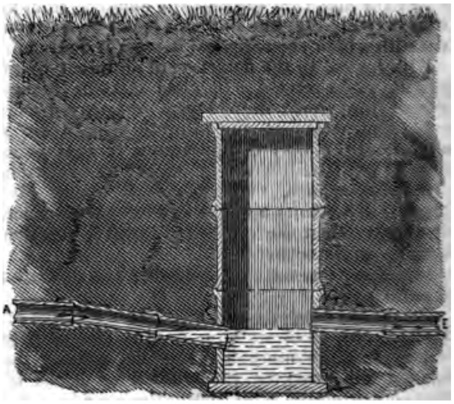
Mr. Winckler[†] has made a series of analyses of different specimens of Portland cement, and comes to the conclusion that the silica may be replaced by alumina or peroxide of iron; that the presence of alumina does not interfere with the hardening of the cement, but renders it less capable of resisting the action of carbonic acid; and that the presence of peroxide of iron renders the cement less hard and less durable.

He also found that, during the hardening of Portland cement, lime is gradually abstracted by water. The composition of the cement, after this action had gone on for some days, was found to correspond closely with the formula $3CaO,2SiO_3+CaO,Al_2O_3$, and he regards this compound as the final result of the action of water upon Portland cement.

He considers the presence of magnesia in Portland cement injurious, owing to the fact that the tribasic silicate of magnesia and lime is not decomposed by water.

The presence of alkalies in the cement seems to accelerate the hardening, probably by facilitating the penetration of water into the mass.

Means of Preventing the Stoppage of Drain Pipes.—The substances which are deposited in drain pipes are chiefly of two kinds, viz., carbonate of lime and oxide of iron. In order to prevent stoppage of drain pipes by the deposition of carbonate of lime, it is necessary to prevent the evolution of the carbonic acid which holds it in solution. M. Magnon[‡] proposes to effect this by constructing an hydraulic joint and chamber over the mouth of the discharge pipes, and when it can be done, at the junction of the principal pipes. The woodcut will show the arrangement of the chamber and pipes which prevents communication between the drain pipes and the air in the chamber



This contrivance is likewise applicable to the prevention of stoppages in drain pipes by ferruginous deposits, inasmuch as it prevents the access of atmospheric air and the consequent peroxidation of the ferruginous substances in solution. The ferruginous deposits vary much in composition, and are almost always mixed with clay, sand, remains of plants, &c. With regard to the production of these deposits, M. Magnon records the following observations: When a deposit of this kind, in a fresh state is placed upon a filter, a perfectly clear liquid is obtained, which remains clear when access of oxygen is prevented, but when exposed to the atmosphere, deposits an ochery substance, which constitutes the principal part of the deposits found in the pipes. When the precipitate that has been washed several times with pure water is exposed to the air, the red colour becomes more strongly developed. After some hours, and if the precipitate is then put into a bottle filled with water, and well closed, the red colour disappears, and it again becomes brown, or almost black, and after a few weeks, a clear liquid may again be separated by filtration, which deposits the ochery substance as before, so that it would seem to contain organic substance which undergoes putrefactive alteration under water, and causes a reduction of the peroxide of iron.

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[*] *Journ. für techn. und ökonomische Chemie*, vi., 1.

[†] *Journ. für prakt. Chemie*, xlvii., 444.

[‡] *Comptes Rendus*, July, 1856. No. 3.

Preparation of Alizarine Ink.—Hr. Leonhardi has obtained a patent* in Hanover for this ink. It is prepared by digesting 24 parts of Aleppo galls and 3 parts of Dutch madder with 120 parts of warm water. The liquid is filtered and mixed with 1.2 parts solution of indigo, 5.2 sulphate of iron, and 2 parts crude acetate of iron solution. The advantages of this ink are, that—

1. It does not contain gum.
2. The tannate of iron is prevented from separating by the sulphate of indigo.
3. Mouldiness is prevented by this addition, and by the acetate of iron.

EFFECTS OF THE PRESENCE OF SULPHUR IN COAL GAS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—It is related of an Italian peasant, who was in the habit of attending the theological discussions carried on in Latin at a certain university, that, being taxed with pedantic affectation for so doing, he replied, "It is true, I do not understand one word of what is said, but nevertheless I always know which of the disputants has the best of the argument, for his opponent *invariably loses his temper*." Perhaps your readers will surmise what would have been this peasant's opinion if he had *seen* Dr. Griffin write his last epistle. That this gentleman is labouring under a kind of furor, seems unfortunately too plain; and since we have been told on very high authority, that "a mild answer turneth away wrath," there can be for me but one line of conduct as regards the demulcent nature of this letter.

By one of those marvellous coincidences of sympathy which are so difficult to trace, Dr. Griffin begins by comparing himself to "the traveller who went from Jerusalem to Jericho," and who, it will be remembered, was *severely beaten*. Now those who have read the last few numbers of the *Journal of Gas Lighting*, will have no difficulty in recognizing that in this respect at least there is a painful similarity of fate, which fully justifies Dr. Griffin's comparison, though it says perhaps little for his prudence in directing attention to it.

In Dr. Griffin's earliest communications upon the subject of "incrusted copper boilers," we were given to understand that "by the grace of the Gas Company," there was no scarcity of "greenish-white incrustation," the average being *half an ounce in two months*: but now it would seem that "an adequate quantity for a satisfactory analysis" is not easily to be had—a fact, permit me to say, which agrees very well indeed with my own experience, as regards both the gas of Bristol and of London. Meanwhile Dr. Griffin, without resorting to any newly-invented absorption theory, might very profitably amuse himself by repeating my suggested experiment with "a globe containing ice," from which he will learn that the ammonia, somehow or other, *does* escape decomposition, and exists in the condensed products in quantity fully sufficient to neutralize all the sulphuric, sulphurous, and other acids therein contained.

I was in hopes that after having had his "cheap coal" assertion completely exploded, Dr. Griffin would have seen the dangerous folly of continuing that reprehensible practice; but he seems insensible to instruction on this head, and hesitates not to declare that I have been "incontinently (*sic*) employed by the Directors of the Bristol Gas Company to write long epistles," a statement the truth of which I deny. To speak in fustian, I have been "employed" neither "*incon-*

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[*] *Mittheilungen des Hannoverschen Gewerbevereins*, 1856, p. 198.

tinently," nor *apodictically*, nor *anagogetically*, because I have not been employed at all "to write long epistles."

In my previous letter to your Journal (which I hope was temperate, and not too rigidly inquisitive), I expressed my surprise at the total absence of ammonia in the incrustation; and this has now brought out the significant fact that there *was* ammonia in it. It contained "nearly half a grain," which of course must have been combined with more than twice its weight of sulphuric acid. Your readers then will judge how far the analysis of the "incrustation" ought to have agreed so marvellously (I might say supernaturally) as it did with the composition of the simple sulphate of copper. Dr. Griffin insinuates that this must have been owing to the presence in it of the "tribasic sulphate of ammonia and copper," a substance which I have elsewhere shown could no more remain on his copper boiler, than ice could exist in a red-hot gas-retort. Nevertheless we are favoured with a table, showing the relative composition of this salt, and that of the simple sulphate of copper, as well as of the incrustation; though what these have to do with the matter, I cannot in any way perceive. The spontaneous decomposition of the tribasic sulphate of ammonia and copper is a circumstance mentioned in almost every chemical work, but seemingly unknown to Dr. Griffin. Berzelius says of it, "A l'air ce sel se décompose peu à peu, exhale de l'ammoniac," &c.; and Dr. Anthony Todd Thomson expresses the same thing in similar words:—"By exposure to the air it parts gradually with ammonia, the blue colour is lost," &c. What then is the use of adducing the composition of a substance of this kind, which never could have been formed on the boiler? The only ammoniacal compound of sulphuric acid and oxide of copper which could possibly have existed on the boiler was the simple sulphate of ammonia and copper, a salt which, whether in the anhydrous or crystallized condition, noway resembles in composition Dr. Griffin's analysis, and which, if it existed in the incrustation, even to a very trifling extent, would completely alter the result, and render impossible that amazing analytical coincidence found by Dr. Griffin between the incrustation and the crystallized sulphate of copper.

Before quitting this notice of the table in question, permit me, however, to remark, that I know of no such salt as that exhibited in the first column, and which is certainly not an "ammonio-sulphate of copper," recognized by any chemical writers of my acquaintance; nor do I see in what way Gmelin at all assists Dr. Griffin out of his difficulty, even if he said that "the anhydrous sulphate of copper recovers its water of crystallization in *moist* air in three days." In reality, Gmelin gives this only on the authority of Brandes, whose name he affixes to the statement, whereas he himself speaks of the efflorescence of the same salt "in dry air." If then we are to place any reliance on Dr. Griffin's analysis, it must be on the supposition that the air at Bristol is *always* "moist," and that the radient heat from the gas-flame and from the boiler, not to mention the "intermittingly red-hot loose pendant flocculi," could not affect the "slate" placed immediately beneath them.

I now come to another of Dr. Griffin's assertions, from which it appears that Berzelius "does not state that the sulphate of copper becomes anhydrous at 104° Fah., but that it then loses only two out of its five atoms of water." The following are Berzelius's words: "Sulfate Cuivrique. Ce sel contient 36 pour cent d'eau, dont l'oxygène est cinq fois celui de la base. A l'air chaud il s'effleurit, abandonne $\frac{2}{5}$ de cette eau, perd sa transparence et devient d'un bleu-clair. A 40 centigrade (104 Fah.) et au-dessus, il perd peu à peu *toute son eau*, devient blanc, et se réduit en poudre au moindre contact." Dumas says something to the same effect, and Graham declares that in the open air it becomes opaque, and loses $\frac{4}{5}$ths of its water at 212°, leaving one atom, which is expelled above 400°; but no one of these authorities has ever seen anything "green" about it.

It is, however, a work of supererogation in me to quote authorities of this stamp in opposition to assertions and analyses which contradict themselves, and to which my own large experience warrants and justifies me in giving a complete contradiction. Everyone must have noticed the white film which forms on the upper part of the glasses used with argand burners, and also on the bell-glasses sometimes suspended over them; this film is the simple sulphate of ammonia, and that it exerts no very destructive action on metals may be gathered by an examination of the tinned-iron tops of our common street lamps, many of which, both in Bristol and London, have been in use for more than twenty-five years, and are still employed.

Dr. Griffin has therefore in vain sought refuge in the celebrated "oil of vitriol bugbear" of Dr. Letheby, forgetful, no doubt, that this monster was brought to an untimely end two years ago by the candid report of Dr. Leeson and Mr. Robert Warington, which elicited the awkward fact, that Dr. Letheby had always used "a platinum *rosette*" when he burnt the gas "as the public burns it!" Dr. Letheby (who, however, found ammonia) is now the health officer to the City of London, but we hear nothing more of this "bugbear," though if he had the least faith in his bygone assertions, this ought to take precedence of every other nuisance. The amount of bisulphuret of carbon in the gas of London is now, and for some time past has been, almost exactly $\frac{1}{1000}$th of the weight of the gas: it is rather less at Bristol, and Dr. Letheby never knew how to determine this until I pointed out the way, or he would not have employed a "rosette," which cannot detect the half of it.

The whole of this bisulphuret of carbon, and also the "other sulphur compounds" unknown to Dr. Griffin, may be easily removed from coal gas without at all injuring its illuminative power; but as every person does not keep a copper boiler, or require absolutely pure gas at a higher price, I have granted permission to all those who, like Dr. Griffin, desire extra purity, to use my invention for complete purification, so that they who please may purify their own gas, and set "cheap coals" and gas directors at defiance; more than this surely cannot be wanted. It would be manifestly absurd to compel the water companies to supply nothing but distilled water, merely because a few persons require that fluid in a pure state; and as Dr. Griffin, it seems, purifies the water furnished to his laboratory, why can he not purify the gas also?

But, Sir, the real question connected with Dr. Griffin's conduct in this matter still remains for discussion, and though I have wasted a little time on other subjects of no great importance merely to expose unfounded assumptions, yet this to which I am about to allude was actually the only part that attracted my serious attention, or deserves more than a passing remark. The form of calumny that seeks to rise by debasing all surrounding objects, is not a quality to be tolerated or passed over in silence, nor can it be glibly explained away by "no personal feelings or hostility." If indeed the latter be the truth, there was all the less reason for Dr. Griffin's baseless attack upon the moral characters and moral honesty of the gentlemen composing the Board of the Bristol Gas Company, an attack not diminished by the equally untrue assertion that these gentlemen had "incontinently employed" me "to wash them white." Dealing freely in such aspersions, Dr. Griffin has probably forgotten what he *did* say, and therefore I will recal it to his memory, soliciting at the same time the attention of your readers to the conclusion. After an incorrect representation of the form in which sulphur exists in purified gas, we find the following declaration:—"This contamination (bisulphuret of carbon) has greatly increased since the reduction in the price of the gas, no doubt from the employment of a cheaper coal, which is highly sulphurized." Here, then. is a distinct chemical assertion with a deduction drawn from it, concerning which there is expressed "no doubt," although it impeaches the honesty and integrity of every individual member of the Board of Directors of the Bristol Gas Company, and to show that this is its real meaning, I need only refer to the spirit in which the matter was taken up by the public newspapers in Bristol.

Now, Sir, if this assertion respecting the "greatly increased" contamination of the gas had been as strictly true as it is certainly erroneous, there might still have existed in the mind of a candid man some doubt as to the accuracy of the above deduction. The fact that "high heats" generate more bisulphuret of carbon than "low ones;" that "new" retorts produce less than "old;" that more of this impurity finds its way to the burner in "warm" than in "cold" weather; and, in short, a variety of causes, well known to practical men, would all have combined to lead any candid person to put a charitable construction upon such a circumstance, rather than surmise, and still less declare, that it was the deliberate act of a body of gentlemen, but very partially interested in the resulting gain. Nevertheless we see that, reckless of an assertion, which he might easily have discovered to be untrue, and which I can prove to be so, Dr. Griffin hesitated not to argue upon that false assumption, and to draw from it a most uncharitable conclusion, which, fortunately for the honour of the parties accused, can be shown any day and in any place to be altogether destitute of foundation. The books of the Company demonstrate that the same kind of coal now used has been used without intermission for more than six years past, and my own recorded experiments prove that the sulphureous contamination of the gas has not "increased" either "largely" or at all during that period.

There is but one more of Dr. Griffin's assertions to which I wish to refer. He says, "If Mr. Thompson has, as he asserts, 'examined the gas of the Company at Bristol, on several occasions within the last six years, both *before* and since the reduction in the price,' he must have exhibited his usual amount of ingenuity, seeing that the reduction took place from the Midsummer of 1850, *more* than six years ago." Now, independently of my own knowledge of the fact, I am able to state on the authority of the Secretary of the Company, that "at the date of the amalgamation of the two companies on the 1st of January, 1853, the price of gas in Bristol was 4*s*. 6*d*. per 1000 cubic feet; on the 1st of July, 1854, it was reduced to 4*s*. 2*d*.; and on the 1st of January, 1856, it was again reduced to 4*s*., at which, with a trifling reduction to very large consumers, it still continues." Any comment upon this is superfluous. I am, Sir, &c.,

3, *Parliament Street, Dec.* 11*th*, 1856. LEWIS THOMPSON.

[Having inadvertently allowed Dr. Griffin, in his communication contained in our last number, to refer to points in dispute between him and Mr. Thompson which had not been previously alluded to in this Journal, we could not refuse the insertion of the foregoing reply, but must now beg our correspondents to consider the discussion here to be closed.—ED. *Ph. Journ.*]

ANOTHER THING FORGOTTEN.

THE article in the December Journal on "Studious Habits," is an implied censure on the present generation of Chemists' Assistants and Apprentices for not having availed themselves of the many opportunities afforded for improvement in the scientific details of their business. Doubtless the complaint is, in some measure, justified by experience. Mr. Ince's clever apology, in a great degree, mitigates the force of the reproof, as any young man actively engaged in the business has but little time for scientific study, and he cannot in fairness expect his employer to afford him opportunities, as such an arrangement formed no part of their original compact; should the employer do so, it is a pure act of grace, and when the nature of the business is considered, more than can be expected. When the Pharmaceutical Society was first established, the writer of this was an assistant in one of the great houses, the heads of which entered with avidity into the scheme, and their assistants were invited to accord their support. At the Monthly Meetings, one or two were permitted to get away, so as to be in Bloomsbury Square by the time half the business had been disposed of. A thirst for improvement was there acquired, and attendance on the lectures delivered in the early morning by Professors Thomson and Redwood commenced; but it was soon found to be the pursuit of knowledge under difficulty, for, on returning to business, the place at the counter had immediately to be assumed till ten o'clock at night, or later. Notes of the lectures were then sought to be transcribed, but alas! a mere skeleton of the good things heard in the morning remained in the overwrought brain. Attendance through the session was persevered in, and information obtained which will always be beneficial, but it was found impossible to continue these efforts longer, being inconsistent both with engagements to employers and the writer's own health. Some disappointment was experienced that an extra hour on the mornings of the lectures was not afforded to profit by the instruction received; but subsequent reflection has shown, that it was scarcely just to expect personal improvement at another's expense.

But it may be said, Where does all this lead to?—to that "other thing forgotten," to which neither the Editor of the Journal nor his agreeable correspondent alluded, viz., *the absence of inducements, as the law stands, for young men to obtain higher qualifications than at present*. The love of labour, either mental or physical, is not inherent in man: some solid advantages must be obtainable by those who consume their time and fortune in acquiring a knowledge of any profession; and when young men are urged to obtain the Society's diploma, a common objection is—"What am I to gain by so doing, as any person can open a Chemist's shop, and I cannot afford to spend two years, and as many hundred pounds, in obtaining a merely honorary distinction." The business of a Chemist and Druggist has been heretofore regarded as a mere trade, and numbers of those engaged in it cannot be considered as having received a liberal education. Most lads are placed apprentice at about fourteen or fifteen years of age; a term of four or five years is served, and a scanty premium being given (seldom exceeding £100), it is evident that the master must remunerate himself by the lad's labour, he having to maintain him for the term. What time or opportunity has an apprentice for self-culture under such a règime? The incipient assistant comes to London, to improve himself in his business and get his living at the same time; his employer has generally to lick him into shape, from six to twelve months being required for this interesting operation; a superior situation is then obtained, offering greater advantages both in salary and experience. Under such circumstances, where is the time to be found for scientific improvement? It is a matter of astonishment that with such a training the Chemists of this country are so respectable in their attainments as they undoubtedly are; probably their occupation induces habits of thoughtfulness and reflection. What a rich harvest of cultivated mind might there not be anticipated, if the soil were well manured at the commencement! How are more "studious habits" to be induced in the rising generation of Pharmaceutists? Clearly by offering sufficient incentives to exertion, which can only be done by the Legislature enacting that the profession of a Pharmaceutist shall only be carried on in time to come by those who have given evidence of their competence. There would then be no lamentations as to the low state of scientific knowledge among our body; as, with such a stimulus, many assistants who are now content to go on in the beaten track would make efforts to qualify themselves, and, resigning their situations, apply themselves assiduously to those studies necessary for their success; and the friends of those entering the business would take into their account the necessary provision for a year or two's devotion to study and laboratory manipulation alone. Can we suppose that the lawyers, doctors, and parsons would devote their time and money to the acquisition of their several diplomas without any actual necessity? or do we find that many attain the requisite proficiency whilst engaged in the active duties of their profession? And this it is which is so frequently urged on Chemists' Assistants; and the result shows that this "experiment" has failed, as none but the acutest intellects or the strongest frames can with safety attempt such a task. We must judge of man in the aggregate—not take the exceptions for our guide; and upon the voluntary principle we shall never obtain what we aim at—that every Chemist and Druggist shall be a qualified man. This being the case, we should urge upon the Legislature to confer upon our Society the necessary powers, and each Member in his own circle might materially aid the cause by showing that the public safety is even more concerned than our individual interests in the question of an adequate provision of qualified Pharmaceutists, whose integrity and professional knowledge would prove the most effectual precaution against such melancholy instances of poisoning, both by accident and design, which have of late so alarmed the community. Should Parliament be disposed to take a common-sense view of the matter, and require that those who sell "Poisons" should know something of their properties and uses, might not the common practice with regard to apprentices with advantage be altered? The five years' term now in vogue might be reduced to three, after which two years could be spent in attending a School of Pharmacy, and, upon giving evidence of competency, a license to practise Pharmacy would follow. A Chemist's Assistant would thus obtain a theoretical knowledge of the sciences pertaining to his avocation—his practical attainments would depend on his opportunities and the use he made of them; but, "studious habits" being engendered, improvement in knowledge would necessarily follow, and where the seed had fallen on good ground, bring forth fruit a hundred-fold. These advantages it will be observed would be obtained by the Chemist's Assistant at his own cost, and he would be urged to these efforts, not from an abstract love of science, but from a sense of self-interest, well knowing he could never expect to be in business for himself without obtaining the diploma of Pharmacy required by law. May we not hope that the next session of Parliament will witness the passing of such an enactment as shall offer encouragement to the man of science, and protection to the public?

Haverstock Hill, Dec. 22nd, 1856. JOHN R. COLLINS.

THERE IS NO TIME.

Eheu, fugaces, Postume, Postume,
Labuntur anni. HORACE, Lib. ii., Ode xiv.

THE Assistant cannot study, and why ? he has neither opportunity or time—the swiftly gliding years yield for him no refreshing hours for mental cultivation, and if they did, he could not study; exhausted nature needs repose, the weary frame requires absolute rest, the over-taxed brain can at such a moment receive no more; if knowledge, information, and instruction were to walk hand in hand and plead for admission, without any exertion, without even a struggle on his part, it could not be done; as well might it be expected that old age should become young again at the mere remembrance of early days and youthful pursuits; the wish may fondly still exist, but not the power; the spirit truly is willing but the flesh is weak.

Look upon this picture of the Chemist's Assistant, and then upon this, where it has been quietly hinted, or rather more than hinted, that the desire for improvement (at least in certain kinds of knowledge), the thirst for information, the yearnings after the "feast of reason and the flow of soul," and the eagerness for intellectual discussion, do not exist to any appreciable extent, or if at all in being, are not brought to light as they should be, by the same ill-starred personage; on either side there are, alas! some shadowings of truth, *hinc illæ lachrymæ*, but, at the same time, another thing appears to have been lost sight of—to have wandered entirely into the shades of oblivion. Is it when he is occupied as an Assistant that a young man is supposed to learn his business ? Is it during that time that he is to become qualified to fill the position of a Pharmaceutist or Chemist and Druggist ? Is it whilst he is receiving his yearly stipend, whatever that may be, that he is understood to be engaged in studying Pharmacy, Chemistry, Materia Medica, Toxicology, and Botany? Is it then that his mind is to be occupied with lectures, test papers and tubes, reagents and precipitating vessels, spirit-lamps, stills, retorts, and alembics ? Is it then, having gained a few hours' respite from his daily toil, that he is expected to *read?* Is it during that particular period of his life that he is intended more especially to enjoy recreation, to have more than the average allowance of liberty, and a more extended arena for acquiring the arts and sciences, so that, when, as years roll on, he becomes a proprietor, having sown his wild oats, he may settle quietly down to toil (for some principals work), whilst his employés improve their minds, pick up information, and, like the busy bee, gather honey from every opening flower, so that, they in turn, may be able to commence business on their own account, and resign their pleasant office to the next comers? Such a picture, such a hope, is a fallacy, a fiction, a romance, and such as indulge in it, do so to the destruction of their visionary expectations. The nature of a Chemist's occupation does not, cannot admit it. What then, in sober earnestness, is the Assistant, and what may be expected from him ? Looking at the question without any optical or mental delusion, it appears that he may be portrayed somewhat thus:—Having entered upon an apprenticeship with a fair amount of classical and commercial knowledge, and having during the time for which he was articled, been taught not only the rudiments, but also instructed in the art and science of a Chemist and Druggist, together with such practical information as the establishment will admit of, he is supposed, at the expiration of the term, to be capable of occupying the post of an Assistant, where his duty is to relieve the proprietor from the more laborious portion of the work, and thus enable him to devote his energies to the proper arrangement and well-being of his establishment. And now, before the pupil becomes an Assistant, is the proper time to give that *necessary* finish to his education, which may be gained by attending lectures and a certain course of manipulation in the laboratory; but, if he cannot afford the time or the means for so doing, he must make the best of the knowledge he already possesses, and seek for that practical experience in the shop of his employer, for the obtaining of which be is otherwise unable exclusively to devote his time; and if he but keep a vigilant eye, a ready hand, and a willing disposition, few days need pass over his head without being able to glean something, to pick up some stray crumbs which fall, and not unfrequently from the well-stored minds of his companions and others with whom he may come in contact. It is to be hoped that the day is not far distant, when, after the daily toil is principally over, an hour or two may, without too much pressure upon the weary senses, be gained to freshen the memory and quicken the understanding, by conning o'er the pages of some new or old favourite author. In order to realize even this, proprietors must unite and cooperate; it would be useless to point at those who do, and such as do not; 'twere vain for the conscience-stricken to urge the compulsory necessity for keeping their establishments open until eleven and past; where an earlier hour of closing has been adopted, the amount of business done has not been less, the customers have not been neglected, but the benefit has been found in the fact, that orders have been brought earlier, and Assistants have laboured with better will, knowing that at a certain hour they could sit down, provided the decks were clear. Independent of the lengthened hour, the nocturnal visitor, and the Sunday watch, there are difficulties and *désagrémens* inseparable from the vocation of a Chemist and Druggist, known alike to the employer and the employed, difficulties for which there is no apparent substitute; and it would be well if, previous to entering upon his career, these could be pointed out to the young aspirant for chemical lore. A liberal education, a fair share of natural abilities, a good stock of perseverance, a no mean quantity of patience, and a reasonable amount of capital, are indispensable to a profitable and prosperous career; without these, few attain even mediocrity, and with them, little more than moderate compensation for outlay: but one word more, having chosen your vocation, strive to make the best of it; if it be not so profitable or so brilliant as your fancy pictured it, if the sunny side be the exception and not the rule, endeavour at least therewith to be content.

> "Poor and content, is rich, and rich enough,
> But riches, fineness, is as poor as winter
> To him that ever fears he shall be poor."

18, *Conduit Street*, 8*th Dec*., 1856. A. F. HASELDEN.

THE VALUE OF TIME.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

DEAR SIR,—It is always amusing, and generally profitable, to read Mr. Ince's letters in the Journal. I wish there were more like him, with ability, inclination, and *time*, to add their quota to the advancement of our common cause.

When reading his letter upon the "One Thing Forgotten," I, as a master, did not feel self-condemned, as my young people do not enter the shop before eight in the morning, and are at liberty to leave off work at eight in the evening, dispensing and customers excepted, shop shut at nine. I need not say more to vindicate myself, before remarking on the subject of want of time, as a just cause of complaint among Assistants and Apprentices of Chemists and Druggists in general, but especially in London.

Reflecting on this subject, my first feeling was,—I am sure that masters generally work hard enough, and have great difficulty in making a living out of their business, although our profits may be large, considering only the cost of material, how then can we allow more time for study and recreation to our young people? We cannot afford more hands, and now barely get the work done! Where is the waste? We rise early, and late take rest, and eat the bread of carefulness, and yet how rare a thing is it to see a Chemist and Druggist retire upon an independence! Why there are, I should think, ten failures to one who retires voluntarily, whilst still capable of enjoying life—perhaps a far greater disparity. How is this? It is not so in other trades. Well, I think the great difference lies in the small value set upon *time* in the operations of our business. In other words, the small amount *charged* for time in reckoning the value of an article. As, for example, a Physician writes a prescription for "two pills, to be taken at bed-time;" the patient cannot spare a servant, and, therefore, sends a man, who is standing idle near her door, with the prescription to the Chemist. The man takes it, and returns in a quarter of an hour, and receives sixpence in payment, which he does not think too much. The Chemist looks over the prescription, as his custom is, remarks on the quantity of opium, when giving it to his Assistant to dispense, he being a young man of education and experience, earning £40 a-year. It takes the Assistant a quarter of an hour to enter it, make the pills, copy the prescription, write on the box, fold and direct it, put the prescription in a wrapper, which is also to be addressed, and then the porter has to take them out; the next morning, the entry is copied from the waste to the day book, called over, posted in ledger, and after, perhaps six months, entered on the bill and paid. And how much, for all this care, responsibility, and labour, can he charge? Just sixpence! Yes; the exact amount paid, in ready money, to the uneducated and idle man who took the prescription to the Chemist. Nor is this an extreme case, as my brethren can testify; in fact, one-half our dispensing is more or less of this character. Is it not evident, that the more we have of this trade, the worse it will be for us. It cannot pay, even if it were all profit, which it certainly is not; in fact, such prescriptions as these eat up the profit upon mixtures and draughts; and thus it is that, at the end of the year, a Dispensing Chemist, with enough to do for three pairs of hands, with his so-called "exorbitant profits," can barely make a respectable living.

Here then I consider is the fault; where is the remedy? The answer is, in education and professional standing. The Physician who wrote the prescription was paid a guinea for it—why was the Chemist, on whom the responsibility even of checking the Physician rests—why was he paid but 6*d.*? Because he is looked upon as a common tradesman, who simply buys and sells at a certain profit. But this should not be; he is more than a mere tradesman, or he is not what he ought to be, a man of thought and education—a man of experience in matters of life and death—a man of high moral character, with a deep sense of responsibility. I trust the time will come when every recognized Pharmaceutical Chemist will be able to make a liberal charge for time occupied in the preparation of a prescription, altogether independent of the value of the materials used, then they will not need to spend much time in cutting and contriving to save and economise by every means in their power—then they will be able, without hesitation, to buy the very best articles at a fair price—then the Wholesale Druggist will find it will not pay to buy inferior drugs, and they will no longer be commonly imported. Then will Dispensing Chemists be able to keep a supply of experienced and competent Assistants for the responsible work of the dispensing department—enough to do the work without *hurry*, even in the busy season; and Apprentices in their earlier years at least, will be chiefly occupied in the laboratory and warehouse, the legitimate sphere of their operation; and lastly, then it will no longer be a mockery for masters to urge their young people to *study*, as they will have time and energy and heart to spare for such employ at seasonable hours. Let us then push on the great work of education at any cost, and take every opportunity of earning the confidence of the Government, that we may in due time be entrusted with the "one thing needful" to complete our usefulness as a Society, and that is, in my humble opinion, the privilege of enforcing a "compulsory examination" on *all entrusted with the dispensing of prescriptions.*

I am, dear Sir, yours faithfully,

December 19*th*, 1856.

A DISPENSING CHEMIST.

THE EDUCATION OF APPRENTICES.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—The Pharmaceutical Society was established for the express purpose of extending knowledge amongst the Chemists and Druggists, and now has made an appeal, I may say, to the nation at large, inviting the assistance of all the Chemists and Druggists in pushing on, and endeavouring to gain the objects for which it was instituted, and to show their earnest desire to become so far qualified in their business, as to prevent the possibility of mistakes arising from *ignorance*. We should expect, therefore, a greater increase in the number of Members, and a still greater increase in the number of Registered Apprentices. To show how very desirous the Chemists in one large town are of improving their position, and aiding the Society to which some of them belong, I beg to place before you the following brief statement:—In a certain town, containing 70,000 inhabitants, there are at least thirty Chemists and Druggists' shops, and in these shops are employed twenty Apprentices and one or two Assistants. Of the thirty Chemists, twelve are M.P.S. Of the twenty Apprentices, *one* is a Registered Apprentice, or at least I should say there was *one* when the list of the Members, Associates, &c., of the Pharmaceutical Society was published; and I have not been able to find that any other has joined the Society since that time. Twelve of these Apprentices are employed in the shops of Members of the Pharmaceutical Society. I would call the attention of the Members of the Pharmaceutical Society to the latter part of the above statement. I think the Members of the Pharmaceutical Society ought to require their Apprentices to join the Society; and I can hardly believe that only one out of twelve can be persuaded either by himself or his master to join the

Society. There is no use in early closing, unless the Apprentices use their time to extend their knowledge of the scientific part of their business, for I presume they have time to learn the practical part. And I very much doubt any young man's studying, unless he sees the good of it. And I very much doubt his constant persevering to gain success, unless an examination looms in the distance, when it becomes a case of "must be." It may be said that a different motive, from mere dread of inability to pass an examination, ought to urge him to study. So much the better if it should be so, but *practically* it matters not *why* he studies. There has been a movement for early closing, which has been to some extent successful. The result is shown in your last Journal. The cry was not for "Knowledge," but for "Time." "Time" is the "*one thing forgotten*" by the public and masters, but "the use for which time is granted," the "*one thing forgotten*" by Assistants and Apprentices. Could you not demonstrate to the Members of the Pharmaceutical Society the necessity there is for their requiring their Apprentices to join the Society?

I am, yours, &c.,

Dec. 16th, 1856. G. Y.

THE EDUCATION OF APPRENTICES.—APOLOGY FOR ASSISTANTS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—Measles and chicken-pox are not less indications of the progress of adolescence than those pleasant anniversary festivals so eagerly looked forward to for their licensed surfeits of cakes and jellies, and for their birthday presents. The Pharmaceutical Society, in like manner, celebrates its anniversary periods by conversaziones, at which the creature-comforts are not forgotten; and it likewise has its throes and fevers at more irregular intervals. It is not, therefore, discouraging to find that something remains to be done—some difficulty to be encountered, which seems to threaten the still young body with a fatal sickness;—something which Mr. Ince thinks has been "*forgotten,*" but which, indeed, has always been looming in the distance, and which has come upon us at a time when we may congratulate ourselves upon being free to grapple with it. You, Sir, may remember, that at the last anniversary, I pointed attention to this subject, reminding the Members that the Society, as an institution, had achieved, so far as depended upon itself, all the objects for which it was formed. It had effected the consolidation of Pharmaceutists into an organized body, sanctioned from an early period by Royal Charter—it had brought them together for purposes of intercommunication, and had established a periodical of technical and scientific information, regularly transmitted to each Member: it had instituted a school, comprising all the essentials of a College of Pharmacy, and affording instruction in each of its departments: it had initiated a system of examinations, and successfully maintained them, until it had obtained for them the authority of the Legislature, making them compulsory upon all future Pharmaceutists. It is, rather, the natural consequence of what had been thus effected than an additional achievement, that we are now incorporated in the compilation of the new Pharmacopœia. That old grievance, against which we were wont to clamour, but which was, really, the penalty of our disorganization—our exclusion from sharing in the compilation of our own codex, is now removed, and we thus early receive a most important instalment of reward.

Now for the application of all these provisions. We have a school—Where are the pupils? We have examiners—Where are the candidates for examination? Shall we look for the students among those already embarked in business? It is clearly impossible for them to divorce themselves from their engagements. Shall we find them among those who are already in the chrysalis stage of Assistants?

This seems to be where both Mr. Ince and yourself direct your eyes, but mine do not follow, for many reasons. First. I do not believe that such an intermittent study as can be reclaimed from daily business, even under the most favourable circumstances, can suffice for such a course as we contemplate, and always have contemplated, and it is to be feared, that the number of Assistants who could devote their whole time, even for a session, would bear but a small proportion to the whole. Secondly. It is not to be hoped that employers would concede to their Assistants that leisure (insufficient as it is) which they cannot command for themselves. Thirdly. If they did so, the opportunities of employing it advantageously are not to be found except in the metropolis and a few large towns. Fourthly. Assistants are often wanting in that previous acquaintance with physical science, which, always desirable, becomes almost indispensable when obstacles, such as they have to contend with, present themselves.

We may indeed—and I hope we shall—find every possible opportunity afforded to Assistants, and made the most of by them, to fit themselves for the more creditable career before us; but we cannot shut out the fact that there *must* be a transition stage, like the change of a dissolving view, when many anomalies will arise, which can only be reconciled by patient and hopeful endurance. We have arrived at this step, and though its superficial aspect is confusion, it is really not less expressive of progress than an epoch of less perplexity. At the same time it appears to me to be an explanation of that failure of the Library "Experiment," which you deplore in your last number. We are now at the crisis of engrafting new habits upon the old, and although we should have been glad to see them strike more kindly, we cannot be unaware that the past training of Assistants has not favoured this result. Nor can it have prepared them for the profitable perusal of such works as it is necessary to seek *out* of the shop library. We should not therefore too harshly censure them, if the undirected and interrupted reading at the Library does not prove sufficiently attractive after twelve hours spent in business.

Still we revert to the question, Where shall we find students for our school, and candidates for our examinations? I repeat what I endeavoured to enforce upon the occasion before referred to—that it is to a different system of apprenticeship that we must look for the propulsion of our scheme of improved education. Much more is now expected from Pharmaceutists, both by the Medical Profession and the public, than was required of the generation past, and we should only deceive ourselves by supposing that enough for future requirements can be attained by any other means than a practically scientific education, much more *thorough* than can possibly be condensed into a ten months' session at Bloomsbury Square. This should be candidly set before the friends of apprentices, and they should be clearly advised, that scientific knowledge is essential to success, and that unless they are already qualified by a liberal education, and are prepared, in every sense, to apply themselves to scientific pursuits, both during their apprenticeship and afterwards, they had better be inducted into some other trade.

The period of apprenticeship to a Pharmaceutist must, in future, be more devoted to study than it has generally been; it must, in fact, resemble the pupilage of a surgeon. Lectures and reading must be a daily exercise, and if this abates from the value of an apprentice's services, it must be compensated by the premium. There is no other way for Pharmaceutists to become fit for their duties in the highest sense, than by prosecuting the sciences by which their avocations are engirt; there is no other way to accomplish this than by an application entirely incompatible with old usages. It must be remembered, that our most honourable duties have slipped through our fingers, but it is encouraging to find so eminent a man as Dr. Christison anticipating the time when we may resume them.* Why should not Pharmaceutists in England, as well as elsewhere, aspire to the higher department of chemical research, as for example, of toxicological investigation, or to the sanitary appointments now generally conferred upon Medical Men, for lack surely of some qualified local professor of the more intimately concerned science of Chemistry. By regaining these our proper functions, we shall exhibit that intrinsic quality upon which alone "status" can depend, without which it even ceases to be honourable—the merit of being really what we profess, and in something more than name—Chemists.

I am, Sir, your obedient Servant,

Clifton, Dec. 6, 1856. R. W. Giles.

THE ADULTERATION OF CALAMINA PRÆPARATA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Seeing the numerous adulterations of taraxacum root mentioned in the Journal of this month, and also in "Notices to Correspondents," a mention made of precipitated sulphur being still adulterated with sulphate of lime, I think it right to add Calamina Præparata to the list of substances which are anything but what they ought to be, notwithstanding the exposure (made by the late Dr. Pereira in the last edition of his *Materia Medica*) of the complete uselessness of the article usually sold in the shops as calamine, and which turned out to be (according to Mr. Moore's analyses) mainly sulphate of baryta. I found, on examining the calamine which I had in stock, that a scarcely perceptible loss was manifest, after ʒss. of it had been treated with ʒv. of diluted sulphuric acid, P. L.

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* Vide *Pharmaceutical Journal*, vol. xvi., p. 13.

Of four other specimens which I tried, two were from dispensing establishments, in which the public have the greatest confidence, and two from wholesale druggists; and of these, *one specimen only* gave evidence of any considerable loss of weight, on being treated with acid, as above mentioned.

The specimen, of which thirty grains was reduced to twenty-two, after treatment with acid, gave evidence also of zinc in the acid solution by the ammonia and ferrocyanide of potassium tests. In neither of the other specimens was there more than a trace of *zinc*.

On ordering three pounds of calamine some days back from a wholesale house, I obtained the usual calamine at 2*d*. per pound, although I had requested an article which would bear the P. L. tests; but a note was sent with it, specifying the sample sent to be the only kind procurable. What are we poor country dispensers to do in this dilemma? An insertion of the above in the Journal would much oblige,

Yours respectfully,

31, *Richmond Place, Brighton, Dec.* 17, 1856. EDWARD WOOD.

[The fact that nearly all the calamine met with in commerce in this country consists wholly or principally of native impure sulphate of baryta, coloured with oxide of iron, has been long known and repeatedly adverted to in this Journal. See vol. iv., page 33, and vol. viii., pages 70 and 321. In the last of these notices, the origin of this substitution, and the impossibility of maintaining uniformity in an impure mineral, such as calamine necessarily is, are pointed out. The best remedy for the evil referred to by our correspondent would be to discard the substance altogether from medical use, and to replace it by carbonate or oxide of zinc.—ED. *Ph. Journ.*]

POISONING BY STRYCHNIA—RECOVERY.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL

DEAR SIR,—I herewith enclose a strip I have cut out of a Canada West newspaper, which I received from Canada during the last month, and send it to you, thinking it may be read with interest: I am not aware that it has found its way into any publication in this country. I am, dear Sir, yours truly,

West Bromwich, Dec. 1*st*, 1856. GEORGE HODGETTS.

EXTRAORDINARY CASE OF ACCIDENTAL POISONING.—LIFE SAVED BY PROMPT REMEDIAL AGENCIES.

We learn that on Saturday night, about ten o'clock, Mr. Josiah Montgomery, one of the city police, swallowed four grains of strychnine, mistaking it for a powder that had been prepared for an opiate which had been prescribed. Mr. M. had some time since procured a quantity of strychnine, for the purpose of killing dogs during the hot season, and had recently put them in a place where medicines were usually kept in his house. On Saturday he obtained some powders of a different kind, to cure a slight complaint of the bowels: these were by some means placed with the papers containing strychnine; and, on taking what he supposed was one of the doses intended for himself, he made a mistake, and took the paper containing the poison. The dose was a large one, containing ten times the amount necessary to cause the death of a man or an animal. He immediately discovered his mistake, and ran into Dr. Swinburn's, a few doors distant, where he procured an emetic. Dr. S. was unwell, but prescribed for him, and after his return home gave a second emetic. Dr. Bly was sent for. Two large emetics, taken in pretty quick succession, failed to cause vomiting. When Dr. Bly arrived, twenty minutes after the poison was taken, the patient lay upon the floor on his back, and was convulsed constantly with the severest form of tetanic spasms, and at times his whole muscular system was rigid, and he lay in the opisthotonos position, resting upon his head and his heels, with his body raised clear from the floor in the form of an arch. Several of these terrible spasms occurred in the space of a minute. His jaws were firmly locked, so that he could not swallow, and it was impossible to open his mouth to administer remedies. The approach of anything toward his mouth caused a recurrence of the spasms. Dr. Bly applied chloroform, which relieved the spasms in about three minutes, and stopped them completely in ten minutes, when a third powerful emetic was given. If the chloroform application was remitted, it was found necessary to keep the patient constantly under the influence of the anæsthetic. In about ten minutes after the third emetic was taken, vomiting was produced. Drs. Ely, Armstrong, and Moore had arrived at this time. Warm water was now given in large quantities, and thrown off the stomach as soon as a sufficient quantity was drunk, until it was believed that the stomach was cleansed of the poison remaining in it. The assisting physicians then left the case with Dr. Ely. The chloroform was still administered, and the patient was kept under its effects until five o'clock on Sunday morning, when the spasms were almost entirely broken up, and at six o'clock they ceased entirely. During the time that the spasmodic action was controlled by the chloroform, the system had opportunity to throw off the poison that had been taken up by the absorbents; and when that was effected, the patient was out of danger. He had retained his consciousness during the whole of the period that he had suffered from the effects of the poison. He was at ten o'clock yesterday in a comfortable state, with a clear mind and a good pulse. The first decided symptoms of returning ease occurred at three o'clock a.m., when the patient requested a chew of tobacco, in which he was indulged.

This case is one of a very remarkable character. It has never been known that a person who had swallowed even a grain of strychnine recovered from its effects. A full statement of the case will no doubt be given for the benefit of the profession in the medical journals.

THE ODONTOLOGICAL SOCIETY.

President.—Samuel Cartwright, Esq., F.R.S.

Vice-Presidents: J. H. Parkinson, Esq.; Arnold Rogers, Esq., F.R.C.S. Treasurer: Edwin Saunders, Esq., F.R.C.S. Council: H. J. Barrett, Esq., M.R.C.S.; William Bigg, Esq.; Alfred Canton, Esq., M.R.C.S.; G. A. Ibbotson, Esq., M.R.C.S.; Robert Nasmyth, M.D., M.R.C.S.; James Parkinson, Esq.; John H. Parkinson, Esq., M.R.C.S.; S. James Salter, Esq., M.B., M.R.C.S.; Hubert Shelley, Esq., M.B., M.R.C.S. Honorary Secretaries: Samuel Cartwright, Esq., Jun., M.R.C.S.; John Tomes, Esq., F.R.S.; Thomas A. Rogers, Esq., M.R.C.S.

COLLEGE OF DENTISTS OF ENGLAND.

Constituted at a public meeting held on the 10th of December.

President.—James Robinson, Esq.

Vice-Presidents: Andrew Clark, Esq.; Samuel Corbett, Esq., Dublin; J.B. Imlack, Esq., Dublin; Norman King, Esq., Exeter; James Louis Oxley, Esq., Leeds; Robert Reid, Esq., Edinburgh; Somerset Tibbs, Esq., Cheltenham. Council: William Crampten, Esq.; John Gray, Esq.; James Hepburn, Esq.; James Harley, Esq.; John Imrie, Esq., Sen.; Henry L. Jacob, Esq., Bridgewater; H. Lintott, Esq.; Donaldson Mackenzie, Esq.; James Merryweather, Esq.; — Mitchell, Esq.; W. Murphy, Esq., Derby; W. Perkins, Esq.; Charles Rogers, Esq.; Adam Thomson, Esq.; J. Underwood, Esq. Treasurer.—Peter Matthews, Esq., 17, Lower Berkeley Street, Portman Square. Honorary Secretaries: Charles James Fox, Esq., 27, Mortimer Street, Cavendish Square (Library and Museum); Alfred Hill, Esq., 36, Euston Square (Corresponding Secretary); Samuel Lee Rymer, Esq., Croydon.

OBITUARY.

DEATH OF DR. PARIS, THE PRESIDENT OF THE COLLEGE OF PHYSICIANS.

It is with very sincere regret that we announce the death of this excellent and distinguished man, which occurred on Wednesday morning, December 24, at half-past eight o'clock, at his residence in Dover Street. For half a century precisely Dr. Paris had practised as a Physician, and had risen to the very highest honours which it was in the power of his professional brethren to bestow. He was born at Cambridge on the 7th of August, in the year 1785, and at twenty-two years of age he was elected Physician to the Westminster Hospital, and he continued in the active exercise of his professional duties until within a fortnight of his death. When but fourteen years of age he commenced his studies for the profession on which he was about to enter, and followed them up with a zeal incredible in so young a person.

When he had attained the age of threescore years and ten, he took upon himself the rduous duties of President of the Medical Council of the Board of Health, and with is own hand wrote the introductory report on the cholera of 1854. He was a member of Caius College, Cambridge, and graduated when very young in medicine. Among his contemporaries he was distinguished for the extent and elegance of his lassical attainments. From Cambridge he went to Edinburgh, then remarkable as school of medicine. On his return to London, at the age of twenty-two, he was lected Physician to the Westminster Hospital, but soon after vacated the appointment, as it was his wish to establish himself in the town of Penzance, in Cornwall.

During his residence at Penzance, Dr. Paris distinguished himself as the founder f the Royal Geological Society of Cornwall. When at Penzance, he gave to the miners the great boon of the "tamping-bar," the instrument by which they are nabled to pursue their business amid inflammable gases without the fear of striking ire from the rock. In the year 1810 he returned to London, and here for forty-ive or forty-six years he was actively occupied as a practising physician. He was lected President of the College of Physicians in the year 1844, and this office he held until the hour of his death. Dr. Paris was not only known as a physician of the highest eminence—he was as remarkable for his literary ability. The *Life of Sir Humphrey Davy* will ever remain one of the classical biographies of the English language. In conjunction with Mr. Fonblanque he also wrote the *Medical Jurisprudence.* His works of a more professional character were his treatise *On Diet*, which first brought him into notice, and which was published at a very early age: his *Pharmacologia*, which has run through more editions than most books: and his work on medical chemistry. Besides these, and many other acknowledged publications, his *Philosophy in Sport* has been very popular. The last ten days of Dr. Paris's life were spent in excruciating sufferings, which were borne with the most remarkable fortitude. His chief concern appeared to be to console and comfort those around him, who could ill disguise their grief at the impending and irreparable loss. His intellect remained to the last as clear as at any time of his life, and while power of speech remained, nobody who listened to him could believe that the end was so near at hand. The public and the medical profession have suffered a great loss in the death of John Ayrton Paris.—Condensed from the *Times*.

REVIEW.

THE ART OF PERFUMERY; *and the Method of Obtaining the Odours of Plants, &c.* By G. W. SEPTIMUS PIESSE. Second edition. Longman, Brown, Green, Longmans, and Roberts. 1856.

THIS work, which has just passed into a second edition, contains a popular and very readable account of the various articles of perfumery now in daily use. From its style, it is evidently more intended for the general public than the Chemist. Most of the substances employed in the manufacture of scents are arranged in alphabetical order and pleasantly described; preliminary remarks having been given as to the manipulating processes required.

The extent to which perfumery is carried may be judged of from the fact, that one producer at Cannes uses annually 140,000 lbs. of orange flowers, 140,000 lbs. of rose leaves, and 20,000 lbs. of violets. The yearly revenue from eau-de-Cologne manufactured *out of England* is £8000, or 20,000 flacons at 8*d.* each. A hint is thrown out as to the impossibility of imitating the genuine eau-de-Cologne, as it is made with grape spirit, which derives its odour from œnanthic ether, whilst the flavour of our own corn spirit depends on fusel oil. An excellent sketch is given of the commercial application of musk, lavender, and roses, and the curious are instructed in the mystery of soaps, bouquets, essences, and pomades. Select formulæ, numerous engravings, and a copious index, combine to form an attractive and useful volume.

It is to be regretted that some passages have been allowed to remain which are contrary to good taste. The elegant lady whose portrait adorns the title-page would object to read :—"It is thus evident that Britannia does not turn up her nose at the odour of nutmeg and mace !" (page 99); or that "a delicate *odeur* has been imparted o her *mouchoir* which has cost *no end of money*" (page 124). This is a matter of opinion, but nothing can justify the allusion to the lily (page 87): "The manufacturing perfumer rejects the advice of the inspired writer to 'consider the lilies of the field.' Rich as they are in odour, they are not cultivated for their perfume." Nor the sentiment expressed in page 206: If we do not do so, some future Macaulay will say of us, as David said of the idols: "Noses have they but they smell not." That wit is indeed homœopathic which tampers with things sacred.

BOOKS RECEIVED.

ÉTUDES BIOGRAPHIQUES POUR SERVIR A L'HISTOIRE DES SCIENCES. Par PAUL-ANTOINE CAP, Première série Chimistes-Naturalistes. Paris: Librarie Victor Masson; pp. 408. 1857. (From the Author.)

THE LITERARY AND SCIENTIFIC REGISTER AND ALMANAC FOR 1857. By J. W. G. GUTCH, M.R.C.S.L., &c. London: David Bogue, Fleet Street (sixteenth year); contains, *in addition to the usual information*, A LARGE NUMBER OF PHOTOGRAPHIC FORMULÆ.

TO CORRESPONDENTS.

THE LIBRARY.—We have received several letters from Correspondents who appear to be rather sore at the imputation that they have not been so diligent as they might have been in attendance in the library. "An Associate" (whose letter would have been inserted if it had been authenticated with his name) disputes the accuracy of our statements respecting the increasing tendency to early closing, and retorts by finding fault with the injudicious selection of matter in this Journal; another states that he called one evening at Bloomsbury Square and found the Library not open, which, he says, is the best reply to our observations. He appears to forget how many weeks or months the Library was open, but no visitors attended. If this discussion should result in a demand for the accommodation and the regular reopening of the Library in the evening, the purpose for which we directed attention to the subject will have been fully answered.

Discipulus (Hull) is very desirous for the establishment of a School of Pharmacy in Hull, where Students could meet in the evening to read and improve themselves, also in the morning during the summer months, to assist them in preparing for the examination. He has no doubt such a boon would be generally appreciated in Hull. [This desire is not unusual in places where there is no school or library.]

E. A. S. (Cheltenham).—Balfour's *Manual of Botany*, Fownes' *Manual of Chemistry*, Taylor *On Poisons*.

W. P. (Nailsea).—We know no formula for a sulphur cerate with chloride of sulphur and soft soap: *Unguentum Sulphuris Hypochloridi Compositum*. Vol. x., p. 67.

W. B. (York).—*Ferri et Quinæ Citras.* Dissolve three parts of citrate of iron, and one part of citrate of quinine in ten parts of distilled water, by a gentle heat, and evaporate to a consistence suitable for scaling on plates.

J. V. (Dunse).—*Normandy's Agricultural Chemistry.*

Pharmacien (London).—*Marine Soap*, we believe, is made by substituting cocoanut oil for the oils and fats used in the preparation of ordinary soaps.

G. H. C. (Scarboro').—*Borated Tincture of Myrrh.* Vol. viii., p. 96.

Etudiant (Kingston-on-Thames).—(1.) *Balfour's Manual of Botany.*—(2.) *Pereira's Materia Medica*, £3 13*s.*—(3.) *Essence of Camphor*—℞—Spirit Camphor 1 oz. Proof Spirit, 7 oz. ♏.

Esculapius (Boston).—*Redwood's Supplement to the Pharmacopœia.*

N. (Norwich) should give his name and address, for reply by post.

A Constant Reader (London).—The term "pharmaceutical preparation" is applied to compounded medicines, and such substances which have undergone some preparation to render them fit for administration as medicines.

A Registered Apprentice (Narbeth).—Benzole.

P. M. F. (Bristol).—The specimen has been received.

SiO_3.—A common drill may be used for making holes in glass, a little oil of turpentine being applied to it, which makes it cut better.

An Apprentice (Davenport).—Iodic acid, and not iodine, is used as a test for morphia

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd) to Mr. CHURCHILL, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

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PROFESSIONAL RESPONSIBILITY.

In the course of the discussions which have taken place in reference to accidental poisoning, and the mode of dealing with the subject by legislative enactment, the preponderance of evidence as well as argument has been in favour of improved education, as the best guarantee to the public that due skill and precautions will be exercised. On the other hand, the fact has been noticed, that the accidents which have occurred from poisoning have not all been traceable to ignorance and incompetence; that, in some instances, the parties concerned have been regularly qualified, either as Medical Practitioners or as Chemists—being persons in whom, according to the educational hypothesis, the public might have confidence. When arguing in favour of a legal test of qualification for all Dispensers of Medicine, we have been met with this strange answer:—"It appears that qualified persons sometimes make mistakes as well as those who are incompetent; and, after all that has been said, education gives the public no positive security against accidents."

It seems almost incredible that a deduction unfavourable to professional education should be drawn from this vague assertion, yet such has been the case in a quarter in which we should not have supposed the fallacy could be entertained for a moment.

The fact that no human beings are infallible is a truism which admits of no dispute; and hence it follows, and is found to be the case, that in all professions and avocations the highest authorities may err—the most acute lawyer may mismanage a case—the best rider may be thrown.

The fate of Mr. Temple, recently made public through the medium of Mr. Brady, M.P., is a striking example. This unfortunate gentleman, whose character had hitherto been unimpeachable, and his integrity undoubted, was travelling from London to Manchester, but for some reason altered his mind and stopped at an intermediate station. He took up a carpet-bag belonging to another person by mistake instead of his own, was detected by a policeman, hurried off to the police-office, and thence to prison. Being among strangers his explanation was disregarded; circumstances, afterwards accounted for, excited suspicion, which was confirmed by an injudicious attempt on his part to escape from prison during the excitement. He was tried for felony, "found guilty," and sentenced to transportation. His wife, distracted with anxiety and distress, was prematurely confined, and the child died in consequence. The shock to his nervous system deprived him of reason. His hair turned white in a night—he became a hopeless idiot, and in rather more than three months he died. A short time before his death his innocence was fully established, and the facts of the case being forwarded to the Secretary of State, he was pardoned—first judicially murdered by mistake, then pardoned. The judge, the jury, and the counsel were duly qualified according to law; the usual means were resorted to for ensuring the administration of justice, yet two lives were sacrificed, and the family of an innocent man ruined by the "legal mistake." Far less agonizing and disastrous in its consequence would have been his death from an overdose of medicine or an error in diagnosis, yet in either of these cases the Chemist or Medical attendant would have been subjected to a searching trial at the bar of public opinion—if not in a court of law—and might have been brought to the verge of ruin by this painful notoriety. Why is the weight of responsibility so much greater in the medical than in the legal profession? Is it because the administration of medicine is a question of life and death, and the law is assumed to be a question of property? A man may be hanged by mistake, or transported by mistake; he may be subjected to tortures worse than death, and his family ruined, by a legal blunder. Not only are the parties implicated screened from public inquiry, but the law makes no provision for even a nominal compensation to the victim or his surviving family, while a Medical Man or a Chemist, in a parallel case, would be liable to an action for damages, and no extenuating circumstances could release him from personal responsibility.

There is in every profession a moral responsibility apart from the contingency of punishment by legal process. We knew a most excellent Judge, distinguished for conscientious benevolence, and the tendency to lean towards the side of mercy, who, on one occasion, after having passed sentence of death, felt some misgivings. In his charge to the jury he had pointed out the possibility of a doubt in one part of the evidence, but when the unanimous verdict of guilty was returned he questioned with himself whether he had laid sufficient stress on the doubtful point. There was no ground for interference. All parties, excepting the Judge, appeared to be perfectly satisfied as to the justice of the verdict. It was his duty to pass sentence of death on the prisoner—a painful duty at all times, but more so than usual on this occasion. After the law had taken its course, he could not dismiss the subject from his mind, but brooded over the details of the evidence, until the doubt became magnified from a mere shadow to almost a certainty; and, under this morbid depression of mind, he reproached himself with having allowed an innocent person to suffer death. He shortly afterwards retired from the bench, and, although no circumstance transpired to confirm his gloomy impression, it was a source of much distress to him during the few remaining years of his life.

Another instance may be mentioned as an illustration. A young man, who had served his apprenticeship to a Chemist, and was an accurate and skilful dispenser, mistook half-an-ounce for an ounce in a very indistinctly written prescription, and on the label directed two tablespoonfuls (instead of one) to be taken for a dose. The patient, a child, was suffering from a complication of organic disease, and was in a hopeless state, but several doses of medicine were taken without bad effect. The mistake was discovered about the time that the child died, and as it transpired that the medicine contained prussic acid, an inquest was held. From the evidence it appeared that the post-mortem examination disclosed a state of disease fully sufficient to account for death from natural causes, and that the medicine, although given in a larger dose than was intended, was not likely to do any mischief. The prescription was handed to several competent persons; some of whom read the quantity ℥ss., while others thought it looked more like ℥j. Little or no censure was passed upon the young man who dispensed the prescription, but the circumstance made such an impression on his mind, that he was in a constant state of nervous apprehension at the liability to such disasters, on which account he soon afterwards abandoned pharmacy, and directed his energies to another channel, in which he is now carrying on a thriving business.

The fact that casualties or errors in judgment may occur even with qualified persons, instead of militating against the importance of education, furnishes an additional argument in its favour; for if, with all the advantages which experience can afford, human nature is still fallible, how much greater is the danger of accident when difficult and delicate scientific duties are undertaken by persons not possessing the rudiments of the requisite education.

The usual motive for discussing this subject is the disposition to establish a monopoly in favour of the qualified class, with the avowed object of protecting the public against the malpractices of ignorant persons. Whatever may be the motive, the object is a laudable one, but the mode usually resorted to for carrying it into effect is founded on an erroneous principle.

The restrictions usually imposed on unqualified persons are so constituted as to bear invidiously upon the public. The penalties are made recoverable for the performance of acts which can only be proved by the treachery of patients, who are implicated in the violation of the law by placing themselves under the care of persons not legally entitled to practise. By this system the sympathies of the public are enlisted in favour of the parties whom it is the object of the law to restrain from practice, and who, by professing to be what they are not, draw dupes into their net. For such deception in regard to medical practice, the law provides no punishment or responsibility, while the guilty parties are effectually screened by the connivance of their deluded patients.

The law as to malpractice in the United States, exemplified in the following case, explains to some extent what we conceive to be the correct view of professional responsibility.

A case of malpractice has just been disposed of in New York. The plaintiff, Mr. Courtney, sued Dr. Henderson for damages done to his eyes. The defendant's counsel raised several points, but it is sufficient to state the second one—"That an error in judgment is not malpractice." The court held that to be good law when applied to a man skilled in anatomy, surgery, or physic, but that it had no application in this case; that the defendant, knowing nothing of anatomy, surgery, or physic, could have no judgment in the matter. The law contemplated a judgment founded upon skill and knowledge in these sciences. That man who would hold a diploma without any knowledge of these sciences, and under such false pretences obtain a patient, and commenced tinkering with the most delicate of all the organs, the eye, must be reckless indeed. An error in judgment of a man skilled in a particular calling is not malpractice, unless it is a gross error. But error in judgment, said the court, in a science of a man unskilled in that science (if such a thing can be) is malpractice. In other words, a person attempting to practise in physic or surgery, without first having obtained a knowledge of such science, is liable for all the damage that is the result of his practice. The case was given to the jury, who returned a verdict of five hundred dollars for plaintiff.

THE INCOME TAX—
ITS PRESSURE UPON PROFESSIONS AND TRADES.

A GENERAL effervescence is observable throughout the kingdom respecting the Property and Income Tax. This wholesome state of excitement is characterised by the usual symptoms—public meetings, resolutions, memorials, petitions, deputations, and a variety of threats addressed to present and future members of Parliament. The subject resolves itself into two questions—first, whether the "war ninepence" shall continue to be levied during a time of peace? secondly, whether any, and if so what, modifications ought to be introduced in the mode of adjusting the pressure on different classes of her Majesty's subjects?

According to the terms of the acts, increasing the tax from 7*d.* to 1*s.* 4*d.* in the pound, the additional sum of 9*d.* is to continue in force for one year from the 5th of April next ensuing after the ratification of peace. The peace having been declared on the 30th of March, but the ratification having been postponed until the 27th of April, the Chancellor of the Exchequer is entitled, according to the strict letter of the law, to the enjoyment of the war ninepence during an entire year after the cessation of hostilities. Leaving the merits of this part of the subject to be argued between the anti-Income Tax agitators and the Chancellor of the Exchequer, we need only allude briefly to that which properly comes within our province, namely, the oppressive influence of the tax on the members of our body, in common with other professions and trades.

Under the existing mode of levying the tax, no distinction is made between permanent and precarious incomes, the same per-centage being taken from dividends derived from realized property, and from incomes arising from professional or commercial avocations, dependent for their continuance on the life and health of individuals, and numerous other casualties.

The income of a professional man can scarcely be estimated (in the event of his decease or retirement) at two years' purchase; the business of a Chemist may, under the most favourable circumstances, realize from two to three years;

yet the income is liable to the same tax as a similar amount derived from land or funded property.

The proprietor of realized property yielding £500 per annum dies, and his family continue to receive the same income. The Chemist, whose income is £500, at his decease leaves a business, which, if sold to the best advantage, realizes less than £100 per annum. Yet these parties are subject to the same amount of taxation in respect of their incomes.

The business of a Chemist is not subject only to the casualties of health and sickness, life and death; but the nature of his avocation is a constant source of anxiety and care. An accident on the part of an Assistant, or a prejudice founded on the criminality or negligence of a customer, for which he is supposed to be responsible, may seriously injure his business, yet he must continue paying the same amount of Income Tax. He dare not ask for a reduction without the risk of losing his reputation altogether. It is a delusion to suppose that the "secrets" of the Income Tax Commissioners are sacred. Oaths may be administered and imprecations uttered, doors closed, and books sealed or kept under lock and key, yet the "secrets" ooze out, the returns find their way to the butterman. Any person who desires to know the income for which his neighbour is chargeable can gratify his curiosity with very little difficulty, and thus many persons in business with fluctuating incomes are obliged in self-defence to pay upon imaginary returns, "not what they were, but what they should have been."

Such being the oppressive, inquisitorial, and unequal nature of the Income Tax as now levied, it is our duty to unite, with other professional and commercial classes, in the endeavour to obtain a more equitable adjustment. Some of the evils referred to are inseparable from an Income Tax under any circumstances, but the want of discrimination between the value of permanent and precarious incomes is an injustice which admits of a remedy, and the continuance of the "war ninepence" during a time of peace would be an aggravation of the oppression.

THE DENTAL PROFESSION.

The two new Societies of Dentists are pursuing each its own track. They both discourse from the same text, the substance of which is that the dentists have become a large and important body, yet a body without coherence, without rank or moral status; that the union of the scattered members of this class into one recognized, organized, and influential Society is desirable; that such Society be hereby constituted, and so forth. Thus far they coincide in purpose and principle, and each Society breathing love and harmony to all men, ignores the existence of the other, and invites the scattered members of the profession to come forward and be united into ONE Society. The Odontologicals are located in the rooms of the Pathological Society in George Street; the College of Dentists is planted in the premises of the Chemical Society in Cavendish Square. From each of these centres of attraction the watchword is unity and progress. By what process of fusion or chemical affinity the existence of two distinct Societies can tend towards the desired unity? which is to be the head, and which the "better half" of the profession? and by what powers of reproduction the new race of Dentists is to be formed? are questions which time will solve.

While the objects of the two Societies are the same, they propose to attain the result by different means. The College of Dentists is professedly an educating body, distinct from the medical profession, and declining "the honour of becoming an excrescence on the tail of the College of Surgeons." As a warning against this fungoid state of existence, the Members are informed "there is a deep pit before you, cunningly strewed with flowers; step not heedlessly into it. As the College of Surgeons cannot educate a dentist, how can they examine what they cannot make?" It is therefore proposed that the College of Dentists shall provide all the needful education, surgical, physiological, anatomical, and medical, so far as these branches of knowledge may be necessary, as well as the mechanical or engineering department, which is unknown in Lincoln's Inn Fields. Not only is the new body of Dentists to be isolated from the medical profession, but no person exercising any other business or calling is to be admitted into its ranks, and the door is therefore closed against Chemists and Druggists, who, in country towns and in the suburban districts of the metropolis, occasionally enjoy some reputation as Dentists.

The Odontological Society proposes to unite and elevate the members of the profession by a different process. Assuming that a sound surgical education is and ought to be the foundation of an odontological qualification, and that with this should be combined a practical acquaintance with dental mechanics, the Society does not interfere with the course of education which is provided in the medical schools, but proposes to super-add the requisite mechanical principles, and aims at the establishment of a special examination for Dentists, to be conducted at the College of Surgeons, the Board constituted for that purpose consisting of Fellows of the College, assisted by members of the Odontological Society. To carry this arrangement into effect, it would be necessary to procure an enlargement of the powers conferred on the College by its charter. It would also be requisite to establish, either in the medical schools or elsewhere, a Chair of Dental Surgery and mechanics for the instruction of the future members of the profession. Most Hospitals are provided with Dentists among their staff of Medical Officers, and the needful arrangements for extending the education in this department would be attended with no difficulty.

At a meeting on the 5th of January, at which the Society was inaugurated, the President delivered an address, in which he adverted to the progress which the art and science of dentistry had made by the skill and exertions of individuals, while some had followed the avocation of a Dentist as a profession, and others as a trade. The experience of other professions had demonstrated the advantage of organization and the establishment of a recognized standard of qualification as the basis of a professional status; and the numerical strength of the dental profession, as well as the position enjoyed by many of its members, justified the anticipation, that by the union of their influence, and the cultivation of their art on scientific principles, with periodical association for mutual improvement and discussion, an important advance might be made, and their profession would thus be weeded of that class of empirics who have hitherto brought discredit on the avocation of a Dentist. Several members present expressed their entire concurrence in these sentiments, and acknowledged that they had been ashamed of their profession—the term Dentist having been associated with the irregular proceedings of the parties referred to, and that they had derived their chief claim to respectability by association with the medical profession, of which they felt that it was a privilege to be considered a collateral branch. In future they would have a satisfaction in claiming identity with their professional brethren in the organization of an institution conferring on its members the status which the importance of their functions entitled them to enjoy.

The peculiar and critical position of the dental profession between two coeval Societies, each aiming at unity, but disclaiming rivalry, hostility, and even the recognition of each other's existence, may give rise to speculation as to the relative proportions of latent caloric and propulsive force, the compatibility or otherwise of the two diverging lines of policy, and the probability of the ultimate concentration of influence by a friendly alliance. Whatever may be the course of events, the movement which is taking place cannot fail to be productive of a good result. The dental profession has already acquired additional importance from the public discussion of its merits and requirements; and we have no doubt that, sooner or later, the elements of the two Societies will, either by double decomposition, or by elective affinity, settle down into the form of a permanent and well organized body.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

Wednesday, January 7th, 1857,

MR. JACOB BELL, PRESIDENT, IN THE CHAIR.

The following donations to the Library and Museum were announced:—

Journal of the Society of Arts, from the Society.
Journal of the Photographic Society, from the Society.
Medico-Chirurgical Transactions, from the Society.
Redwood's Supplement to the Pharmacopœia, from the Author.
Archives du Museum, *&c.*, from M. Weddell.
Specimens of bark, wood, &c., illustrating the natural source of the red Cinchona bark of commerce; also specimens of pure quinidine and cinchonidine, from Mr. J. E. Howard.
Taraxacum root, from Mr. Whipple.

The following papers were read:—

ON *CŒLOCLINE POLYCARPA*, A. DC., THE *BERBERINE* OR *YELLOW-DYE TREE* OF SOUDAN.

BY WILLIAM F. DANIELL, M.D., F.L.S.,
Honorary Member of the Pharmaceutical Society.

Among the valuable dye-woods indigenous to tropical Africa, may be included the bark of a tree, which yields not only a rich yellow color, but constitutes a remedial agent of some celebrity in Sierra Leone and the adjacent countries. In consequence of several native doctors having successfully treated chronic ulcers of long standing by the employment of various preparations of the bark, my efforts for some years past have been directed to discover the plant that furnished their supply. During my recent sojourn in Sierra Leone, I had the good fortune to obtain the long sought for specimens of the plant, in leaf, flower, and fruit. The tree producing this useful bark has been identified by Mr. Bennett with *Unona? polycarpa*, DC.,[*] since doubtfully arranged by M. Alphonse de Candolle as a species of his genus *Cœlocline*. Of this genus it forms a very remarkable section, characterized by the absence of an inner series of petals; the thickly coriaceous substance of the outer series; and the inch-long stipites of its very numerous single-seeded carpella. Mr. Bennett is not disposed on these accounts to regard it as forming a distinct genus, inasmuch as the same reduction of petals, accompanied by the same valvate æstivation, and coriaceous texture of the remaining outer series, is found in sections both of *Anona* and *Uvaria*, as at present constituted: the reduction to a single seed is not uncommon in other polyspermous genera of the order; and carpella more or less stipitate are found in many genera in which they are ordinarily sessile, or nearly so. Under the succeeding name De Candolle thus describes the incomplete specimen of Afzelius.

UNONA? POLYCARPA.

U. foliis oblongis acuminatis subglaucis glabratis, nervo medio basi subtomentoso, baccis longè stipitatis.

Hab. in Sierrâ Leonâ. *Afzelius* (v. s. sp. sine fl. in h. Lamb.).

Rami teretes, nascentes apice vix pubentes, demùm glabri; folia oblonga acumi-

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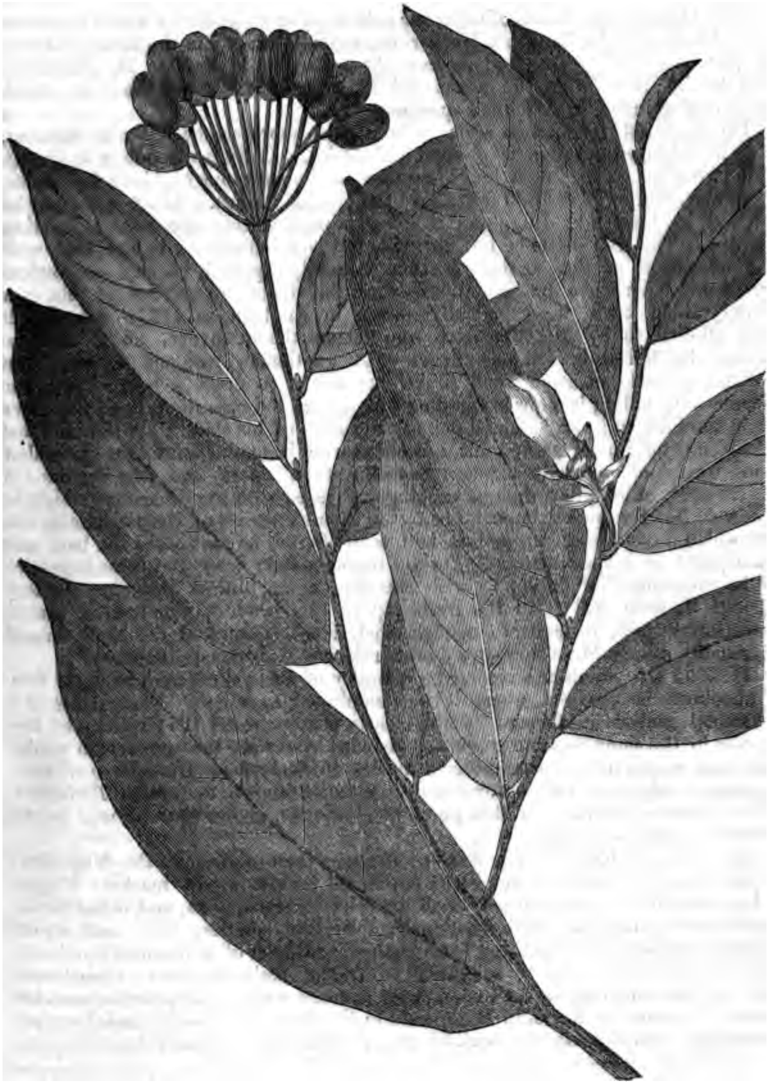
[*] *Syst. Veget.*, i., p. 499.

nata brevissimè petiolata subglauca, nascentia subtùs lente visa subpubentia, dein glabra excepto nervo medio ad basim utrinquè subtomentoso, 4 poll. longa, 12—15 lin. lata; pedunculi semipollicares uniflori; flores ignoti; torus planiusculus pedicellos circiter 30 pollicem et paulò ultrà longos teretes apice subclavatos umbellatos nudos gerens; hi pedicelli cum toro continui in specimine mihi obvio post anthesin perstiterunt et carpella apice pedicelli articulata deciderunt omnia; an potius Guatteriæ species? an genus proprium?



CŒLOCLINE POLYCARPA, A. DC.

To this description Mr. Bennett adds the following particulars. "Sepala tria, ovata, sericeo-tomentosa; petala seriei exterioris quadruplo longiora, pollicem ferè longa, crassè coriacea, intùs infernè excavata supernè carinata, extùs sericeo-tomentosa, oblonga, obtusiuscula, carinis approximatis æstivatione valvata; seriei interioris omninò deficientia; stamina multi-seriata, filamentis nullis; carpella vix baccata, monosperma; semen ovali-subcylindricum, pericarpio arctè adhærens exarillatum, albumine more solito Anonacearum ruminato; embryone parvo, ad seminis basin sito.

"Dr. Daniell's specimens of *Cœlocline polycarpa* agree perfectly with a specimen from Afzelius in the Banksian Herbarium, which is exactly in the same condition as that described by De Candolle from the herbarium of the late Mr. Lambert, and furnish, in addition, the means of describing the flower and the fruit, which were both wanting in Afzelius's specimen."

This vegetable production appears to flourish more exuberantly in Soudan, than in the maritime regions of equatorial Africa. In Sierra Leone it is chiefly found growing on the Sugar-loaf Mountains, and continuous highland declivities, at an elevation of 12 or 1600 feet above the level of the sea. The flowers may be noticed in June and July, and the fruit ripens during the two succeeding months. The tree is one of low altitude, and very moderate in size, and, with the exception of the cortical portion, is rarely applied to any economical purpose. There can be little doubt that the dyeing properties of this, or a closely-allied bark, were partially known in England in 1787, and that it was alluded to by Mr. Clarkson, who relates the discovery, which occurred under the following circumstances:—"A gentleman resident on the coast (of Africa) ordered some wood to be cut down, to erect a hut. While the people were felling it, he was standing by; during the operation, some juice flew from the bark of it, and stained one of the ruffles of his shirt. He thought that the stain would have washed out, but on wearing it again, found that the yellow spot was much more bright and beautiful than before, and that it gained in lustre every subsequent time of washing. Pleased with the discovery, which he knew to be of so much importance to the manufacturers of Great Britain, and for which a considerable premium had been offered, he sent home the bark now mentioned as a specimen. He is since unfortunately dead, and little hopes are to be entertained of falling in with this tree again, unless a similar accident should discover it."* As the fresh sap of this product produces a similar permanent stain, it tends to confirm their identity, and at the same time to agreeably relieve Mr. Clarkson's doubts relative to its non-rediscovery.

In 1855 Dr. Stenhouse received a quantity of this yellow bark brought from Abbeokuta, in Yorruba, where it was employed as a dye. The results of a chemical analysis performed by him clearly demonstrated the presence of *Berberine* in the same to some amount. He suspected that the tree which yielded the bark would prove to be either a species of *Berberis* or *Menispermum*, which belong to the only two natural orders hitherto known to furnish *Berberine*.† The botanical position of this plant in *Anonaceæ*, shows that he was not far wrong in his conjectures.

In 1845 Dr. King, of the Ethiope steamer, then trading up the Niger, presented me with pieces of this bark, purchased by him in the markets of Egga. He stated that it was generally used for coloring skins, mats, and other fabrics, and occasionally the teeth of females. Bridles, saddles, fans, and various domestic articles manufactured from leather, and dyed of a beautiful yellow by this substance, are specially sought after by the Arab merchants from Fezzan and the Sahara, in barter for their equally coveted wares. Clapperton remarked that the women of Kulfe, in Nufe, were in the habit of staining their teeth and inner lips yellow with the bark of a root; doubtless procured from the same

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* *On the Impolicy of the African Slave Trade*, &c., ch. i., sect. 1, p. 13.

† *Pharmaceutical Journal*, vol. xiv., p. 455.

* Oldfield, in his description of the mode of preparing skins at Rabbah, arves that with the red dye elicited from the stalks of the red *dowa* (*Andro-m rubrum*, Kth.†), was also combined a yellow bark resembling (that from) *Cinchona cordifolia*.‡ According to Dr. King, this cortical constituent was same he had obtained at Egga, and was to be met with, more or less, in the ket-towns of the upper Niger.

n the younger trees the bark is much smoother than in those of maturer age, latter being somewhat corrugated by minute longitudinal elevations and res. The epidermis is of a singular greenish-grey color, stained occasionally rregular blackish patches, while the whole of the inner fibres are of a golden ow, the layers of which can be peeled off in thin ribbon-like bands. When wed, it tinges the saliva yellow, and leaves a moderate but disagreeable bitter- on the palate. It is sold in the markets of Sierra Leone in small bundles, posed of fragments, varying from one to two feet in length, one-quarter to half nch in thickness, and about four or six inches in breadth. The yellow sub-ce, when reduced into a coarse powder, becomes a tropical remedy of great ite, in the treatment of indolent ulcers, and chronic leprous sores of the ex-nities. Its medicinal virtues can only be attributed to the *Berberine* it contains. country mode of appliance is as follows:—The sore is repeatedly washed ht and morning) by a strong decoction of the bark, after which this powder is kly sprinkled over the part, or, previously to its application, converted into a d of paste, the dressing being confined to the ulcer by a leaf of some species of s placed over it, and retained in its position by vegetable withes ch encircle the limb. Winterbottom, in his enumeration of the medicinal lucts used by the aboriginal tribes of Western Africa, has not allowed this ortant production to escape his attention. He observes that among the loms it was termed *Bongiare*, and by the Timnehs *Pongia-cananga*, and was ned an efficacious remedy for ulcers. "It is a strong and rather unpleasant er, but has very little astringency. When chewed, or infused in water, it lily yields a beautiful and durable yellow colour, which is used by the ives for dyeing mats, &c. The powder of the bark is sprinkled upon the r every day, and if the sore be large, it is applied twice a day; but when re appears a disposition to heal, the application is made but once a day. A oction of this bark is also used as a wash to the ulcer, previously to the use he powder. When the powder has been applied two or three days, a crust as round the edge of the sore, and is pulled off when dry."§

ON QUINIDINE.

BY J. E. DE VRY, PH.D., ROTTERDAM,

Honorary Member of the Pharmaceutical Society of Great Britain.

n the year 1853, Pasteur found that the substance called *Quinidine* was a ture of two crystallizable alkaloids, each of which had a different rotatory er when observed in the polarizing apparatus.

he greater part of the mixture was lævogyre, and the crystals were not red in the air. With chlorine and *Liquor ammoniæ* no green coloration was erved. To this part of the mixture, Pasteur gave the name of *Cinchonidine*. he smaller part of the mixture was *quinidine*; it was dextrogyre and isomeric a quinine. The crystals were efflorescent in dry air and very soon became que. With chlorine and *Liquor ammoniæ* they showed the same green colour loes quinine when similarly treated.

Journal of a Second Expedition into the Interior of Africa, &c., ch. iv., p. 140.

The *Kinto-woolimo*, or three months Kous of the Mandingo's of Senegambia, who manuure a fine red dye from it, by macerating the stems in an alkaline ley. Most of their er equipments and ornaments are colored deep red by this preparation.

Narrative of an Expedition into the Interior of Africa, vol. ii., p. 80.

An Account of the Native Africans, &c., vol. ii., p. 196.

Although the mixture which Pasteur examined, consisted of *cinchonidine* and *quinidine*, my own observations have shown me that the greater part of the so-called *quinidine* met with in trade has been, until recently, nothing else than *cinchonidine* containing more or less *quinine*. Thus, for instance, in the Paris Exhibition of 1855, there were several samples of so-called *quinidine*, and of its compounds, but I found them to be all mainly *cinchonidine*.

I am indebted to Mr. John Eliot Howard for having first supplied me with genuine quinidine, perfectly pure: soon after I had become acquainted with its properties, my friend M. Delondre also sent me several samples of true quinidine, in a state of greater or less purity. The quinidine of Mr. Howard was so pure, that I found the same rotatory power as Pasteur, viz. 250° ↗ .

Although I am still occupied with the investigation of quinidine and the other cinchona-alkaloids, which investigation is not yet completed, I will not delay making known one property of quinidine by which it differs widely from the other three cinchona-alkaloids, because the knowledge of this property may be useful for the successful separation of quinidine from its cognate alkaloids.

Quinidine forms with hydriodic acid a salt which is very difficultly soluble. One part of *neutral* hydriodate of quinidine requires 1250 parts of water at 60° F. for its solution. The *acid* hydriodate is much more soluble, for one part is dissolved by 90 parts of water at 60° F. By this difficult solubility of its neutral hydriodate, the presence of quinidine can easily be detected. I was enabled by this reaction together with the observation by polarized light, to prove undoubtedly that the so-called β *Quinine* of Van Heyningen is nothing else than *quinidine*. A few grains of β Quinine prepared by the late M. Van Heyningen himself, enabled me to prove this fact.

Although the sulphate of quinidine is sparingly soluble in cold water, the solution is nevertheless very strongly precipitated by a solution of iodide of potassium. I have no doubt that the manufacturers of quinine will be able by using this reaction, to find quinidine in many specimens of the so-called *quinoidine* or *amorphous quinine*, or at least, in the mother-liquors obtained in the preparation of sulphate of quinine.* In the hands of the scientific manufacturer, such as Mr. Howard, it may serve for the discovery of the barks which contain quinidine. If a bark contains quinidine, a tincture made with strong alcohol, will form crystals of hydriodate of quinidine upon the addition of a few drops of hydriodic acid and stirring the liquid with a glass rod. If quinidine is present, small crystals will separate, either immediately or after some hours, wherever the rod shall have rubbed against the glass.

IODIDE OF ANTIMONY.

Mr. W. Copney, of St. Mary's Hospital, brought this preparation under the notice of the Meeting. It had been recently introduced as a therapeutical agent at the hospital to which he was attached, and as it was a substance not met with in commerce, he had been requested by Mr. Ure, Surgeon to the hospital, to prepare some of it. He had not found any detailed account of the process for making it in the books generally accessible to Pharmaceutists, and therefore thought that a few particulars on this point might be acceptable. After the trial of several methods for effecting the combination of the elements, which proved more or less inapplicable or inconvenient, he adopted the following as that which afforded the most satisfactory result:—

A quantity of metallic antimony, having been reduced to a coarse powder, was mixed gently with pure iodine, in the proportion of three equivalents of the latter to one of the former. The mixture was transferred to a Florence flask, and cautiously heated over the gas flame. Combination speedily took place, with a great and sudden increase of temperature and the liquefaction of the contents of the flask. By way of precaution the neck of the flask was lightly plugged with cotton wool, to act as a yielding impediment to the projection of any of the materials, or the escape of the vapour of iodine during the process. The heat being withdrawn, the flask was allowed to cool, then broken, and the contents removed.

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* This supposition has since been proved by the examination of quinoidine from the manufactory of Mr. Zimmer, from which I obtained 23 per cent. of hydriodate of quinidine.

Teriodide of antimony, thus prepared, was found to be a somewhat crystalline or foliated mass, having a semi-metallic appearance. On scratching the surface the part became distinctly red. By trituration a deep orange-red powder was obtained. It readily fuses into a dark red liquid. By continuing the heat it is sublimed in the form of crystalline or plumose laminæ of a yellowish-red colour.

Triturated or shaken with water, it became of a yellow colour, this being a subiodide or oxyiodide resulting from the abstraction of iodine by, and in the production of hydriodic acid with the hydrogen of, the water; a behaviour analogous to that of the chloride of antimony when similarly treated.

The form of administration adopted was that of pills; the dose a quarter of a grain to a grain. As an outward application it was used suspended by means of mucilage.

An attempt was made to prepare a solution similar to Donovan's, substituting antimony for arsenic. As anticipated, the liquid refused to retain the iodide of antimony. It is probable, however, that with an excess of hydriodic acid, and by preparing a much stronger solution, a liquid of this kind might be prepared; but it is also probable that it would be impossible to make a mixture of it without its becoming decomposed.

ON EXTRACT OF LIQUORICE.

Mr. Redwood made a verbal report of the result of some experiments which have recently been made in France on the preparation of extract of liquorice. In that country, as well as in England, the attention of Pharmaceutists had been directed to the fact that some of the varieties of so-called extract of liquorice always contain a considerable quantity of foreign matter, and the question had arisen whether this foreign matter was necessary to give the required qualities to the product or not. Besides the strictly pharmaceutical uses to which extract of liquorice was applied, it was also, and much more largely, used as a lozenge or sweetmeat, and it was in these latter forms it was found to contain the foreign matter referred to.

In England there were met with in commerce—

1. *Extract of liquorice*, in the form of a soft extract, intended for medicinal use, and made according to instructions given in the Pharmacopœia.

2. *Refined liquorice*, in the form of small cylinders of about the size of a quill, hard, black, and brittle, and having a shining surface.

3. *Pontefract cakes*, in the form of round lozenges, about the size of a shilling, with the representation of a castle stamped on one side; hard but not brittle, and having a dull black surface.

4. *Spanish, or Italian juice*, in the form of cylinders, sometimes a little flattened, about an inch in diameter and five or six inches long; hard, black, and breaking with a glossy fracture.

These all consisted, essentially, of extract of liquorice, that being the only active ingredient, yet they all possessed characters which served to distinguish one from another. Strictly speaking, the term extract of liquorice could only be applied to the first, and that only ought to be used when extract of liquorice was ordered in medicine. The other varieties, however, had been long established in public favour, and had distinct and legitimate applications as lozenges or sweetmeats. A very little examination of the second, third, and fourth varieties would serve to show that they possessed characters and properties different from those of the first variety, and that these differences were not merely due to the extent to which inspissation had been carried. The second, third, and fourth varieties were intended for administration in the form in which they were sold. They were less intensely sweet and less acrid than the true extract of liquorice. They could also be exposed to the air without attracting moisture, becoming soft, and losing the form which had been given to them, which would not be the case with pure extract of liquorice in a hardened state.

If the four varieties named were all viewed as extracts of liquorice, and if they were to be tested as to their genuineness, all, excepting the first, would be found to contain variable quantities of foreign matters which tended to impart the peculiar properties by which they are distinguished. Some writers, under the impression that these foreign matters were unnecessary, had designated them adulterations, but this, he thought, was a misapplication of the term adulteration. Spanish and Italian juice, Pontefract cakes, and refined liquorice, necessarily contained something more than was present, or ought to be present, in pure extract of liquorice, such as was designed for pharmaceutical use. There were differences, no doubt, in the qualities of the preparations sold under the names just mentioned, some samples of Spanish or Italian juice, for instance, being very inferior to others; and although the price, in such cases, bore a pretty near relation to the quality, yet, where inferiority of quality was the result of the unnecessary addition of foreign matter, this would correctly be termed an adulteration.

The question had been discussed in France, as to whether anything beyond that which was derived from the liquorice root was required for making extract of liquorice, such as people carried about in their pockets, and little boys used for blackening their lips. At first it was readily conceded that some addition of gum, or starch, or gelatine was necessary to give increased hardness and permanence to the product when exposed to the air, and to reduce the intense sweetness, to cover the acridity, and lessen the too rapid solubility, which characterize the pure extract. Mr. Delondre, a manufacturer of Havre, however, after numerous unsuccessful trials, at length succeeded in preparing an extract, possessing the requisite qualities, and containing nothing that was not derived from the liquorice root. Having communicated his result, accompanied with specimens, to the *Journal de Pharmacie*, a committee was appointed to investigate the subject and report upon the value of Mr. Delondre's process.

The process first communicated by Mr. Delondre consisted simply in treating the liquorice root by displacement with hot water, clarifying the liquor, and evaporating it as quickly as possible to the required consistence. On trying this process the committee failed to get a product such as was required, and such as the author had indicated. The extract, when first prepared, was hard and brilliant, but after being exposed to the air for a few days it became soft, so that the cylinders lost their form. The taste was also less agreeable than that of commercial liquorice. On representing this result to Mr. Delondre, it was found that in his process steam was made to pass through the displacement apparatus, the condensation of which yielded the hot water by which the root was exhausted. This accounted for the difference in the results obtained, as the steam extracted from the root a much larger quantity of matter than could be obtained by hot water alone.

The committee, with the view of ascertaining the nature of the products obtained by exhausting the root with different menstrua, submitted a quantity of liquorice root to the successive action, first of cold water, then of boiling water, and lastly, of steam.

The liquorice root yielded to cold water fifteen per cent. of its weight of extract, and the extract thus produced, on being redissolved in water, left an insoluble residue, amounting to 4.22 per cent.

The marc which had been exhausted with cold water, yielded to boiling water a further portion of extract, amounting to 7.5 per cent. This extract, on being redissolved in water, left an insoluble residue, amounting to 4.7 per cent.

Both these extracts were very hygroscopic, speedily becoming soft when exposed to the air, and the masses, although originally hard and dry, soon losing their form and sticking together. They were also less agreeable in flavour, and much more soluble than commercial liquorice.

The marc which had been exhausted first with cold, and then with boiling water, was in the next place treated with steam, which extracted sixteen per cent. of an extract, which differed entirely from those previously obtained. This extract was hard, dry, friable, and almost pulverulent; cracked and fell to pieces in the drying stove; had a sweet taste without any acridity; remained in the mouth for some time without dissolving; and only dissolved to the extent of forty-three per cent. of its weight in cold water. It appeared that this product was capable of replacing gum, starch, or gelatine, in commercial liquorice, giving the required qualities to that product.

The committee treated liquorice root at once with steam, according to Delondre's process, and obtained in this way from forty-two to forty-five per cent. of extract, which possessed the qualities required in that used as a sweetmeat.

The results of the investigation had tended to show that pure extract of liquorice, such as that used in pharmacy, cannot be made into refined liquorice, Pontefract cakes, or Spanish or Italian juice, without the addition of some foreign matter, which usually consists of gum, starch, or gelatine, but that these additions may be replaced by an imperfectly soluble product, obtained from the liquorice root by the action of steam.

The **Chairman** thought the subject an interesting and instructive one. It was evident that extract of liquorice, when used as a sweetmeat, should possess certain mechanical characters, in addition to those of a medicinal nature, and to impart these, the admixture of some foreign matter was necessary. When used in medicine, however, no such admixture was required or justifiable, and no other sort of extract of liquorice ought to be used in the preparation of medicines than the pure extract, such as was ordered in the Pharmacopœia. Even the extract made according to Delondre's process, which contained nothing besides what was derived from the liquorice root, would be inapplicable.

Mr. **Whipple** had found from experience that the quantity of extract yielded by the root was not uniform,—it varied with different samples of root; but he had generally obtained nearly the same quantity as that stated by the French committee. He quite agreed with the committee in one respect: that the extract, however carefully made, did not form a clear solution when redissolved in water. If the liquor was evaporated in copper vessels, it was necessary to complete the process as quickly as possible, as it readily acted on the copper.

PHYTOLOGICAL CLUB.

The Fourth General Annual Meeting was held on Wednesday, Jan. 14th, 1857,

ROBERT BENTLEY, F.L.S., PRESIDENT, IN THE CHAIR.

The following Report of the Committee was read:—

The Committee of Management of the Phytological Club, in presenting their Fourth Annual Report, congratulate the Members on the present position of the Club.

Upwards of 500 plants have been distributed among the Members, and about 150 species have been added to the herbarium of reference, which now includes above 670 species, and may be inspected by Members on application to the officers of the Club.

The Committee regret that the donations received during the past year have not been so large as usual.

The Committee organized one botanical excursion, which took place in June last, and would suggest that, with the active co-operation of the Members, several of a similar kind might be made during the ensuing summer months.

The Committee regret that, although meetings are regularly held during the winter months, the supply of papers is more limited than they could wish. They would suggest, therefore, with the view of increasing the interest in the proceedings of the Club, that the Members might prepare a short account of their botanical excursions, and forward them to the Secretary, 17, Bloomsbury Square. These, particularly if accompanied by specimens, might prove very interesting.

The Treasurer's Report showed a balance in hand of £10 9*s.* 6*d.*

The Report having been unanimously adopted, the following officers were elected for the ensuing year :—

President, Robert Bentley, F.L.S. ; Vice-Presidents, Jacob Bell, F.L.S. ; Henry Deane, F.L.S. ; T. N. R. Morson, F.L.S. ; T. Redwood, Ph.D. ; P. Squire, M.R.I. ; Treasurer, Daniel Hanbury, F.L.S. ; Curators, Mr. J. C. Braithwaite and Mr. Schweitzer ; other Members of Committee, Mr. Grundy, Mr. Greenish, Mr. Blyth, Mr. Prentis, Mr. Sharpe, Mr. Tupholme ; C. Wood, Hon. Secretary.

Mr. Lindsey Blyth having resigned the office of Secretary, in consequence of ill health, the thanks of the Club were voted to him for the very efficient manner in which he had performed the duties during the last three years.

The thanks of the Club were then voted to the Council of the Pharmaceutical Society for the use of their rooms, and to the Editor of the *Pharmaceutical Journal*, for the insertion of the reports of the meetings.

The next meeting of the Club will be held on Wednesday, February 11, 1857, at half-past eight P.M., when a paper will be read by Mr. Tupholme "On the Microscopical Examination of some Vegetable Tissue found in Coal."

PHARMACEUTICAL SOCIETY,

NORTH BRITISH BRANCH.

A MEETING of the Pharmaceutical Society was held in 50, George Street, Edinburgh, on Friday evening, the 16th January, at nine o'clock,

MR. FLOCKHART IN THE CHAIR.

Several apologies were intimated from Members, who were unable to attend from indisposition and other causes.

Mr. J. F. MACFARLAN read a concluding paper on

METHYLATED SPIRIT AND SOME OF ITS PREPARATIONS.

IN a short paper which I had the honour of reading before the Society in the course of last session, I noticed the boon conferred by the Government on the trade and manufactures of the country, and especially on the chemical and pharmaceutical departments of industry, in the allowance of spirit of wine duty free for certain purposes. The gift was indeed burdened with the condition that one-tenth of its bulk of pyroxylic spirit should be mingled with it to prevent abuse to the injury of the revenue. This condition necessarily limited the extent of the boon. For some purposes, the addition of pyroxylic spirit unfitted the spirit of wine altogether. Of these, nothing need be said. For other purposes, again, the large proportion which it was considered needful to employ in the first instance, operates injuriously. It does so in some chemical processes, and it does so to some extent even in such articles as French polish, from the volatility of the vapour of the pyroxylic spirit, and its pungency affecting the health of the workmen, and especially acting on their eyes. This matter has been pressed upon the attention of the Commissioners of Inland Revenue, and will no doubt receive the earnest attention of the honourable board. Indeed, in the first report submitted by Drs. Graham, Hoffmann, and Redwood, it is stated that five per cent. "is more than sufficient to render spirit unsaleable as a beverage ;" and they add in their recapitulation, that "it may be found safe to reduce eventually the proportion of the mixing ingredient to five per cent., or even a smaller proportion, although it is recommended to begin with the larger proportion of ten per cent." The experience which the Board has now had of the working of the measure will, it may be hoped, suffice to satisfy the Commissioners that the time has arrived when it may be safe to reduce the proportion, as thus originally contemplated, to five per cent.

Another point of less importance, but still of sufficient consequence to demand attention, may be noticed in the quantity of lac required to be dissolved in the methylated spirit, in order to its free sale under the name of "finish." Were the quantity reduced, finish would be rendered much more useful. Such a reduction, I find, has been recommended to the Commissioners by Messrs. Thos. Devereux and Son, who suggest that one ounce would equally protect the revenue from fraud as three, and render the finish fit for the finer descriptions of works. On this point I made a number of experiments which led me substantially to the same conclusion, and I feel convinced that a reduction to a great extent may be made without injury either to the revenue or to the morals of the people. It is certainly gratifying to find that the Commissioners have shown no disposition to retract any of the grants which they have made, but, on the contrary, to continue and even extend them as far as circumstances will admit. The Report* which they published a few months ago, may be received as most satisfactory evidence on this point, while the replies which their queries elicited, show to some extent the uses to which the methylated spirit has been applied. The letters of Professor Hoffmann, Mr. Abel, Professor Williamson, Professor Wilson, Mr. Christy, Messrs. T. and A. White, &c., show the importance of the boon, and fully justify the Government in making it. It was at once a wise and safe measure. Had any doubt remained on the minds of the Commissioners, such a testimony as the following from Messrs. White is well calculated to remove it :—

"In the first six weeks after we were permitted to use it (methylated spirit) in the manufacture of sweet spirits of nitre, 600 gallons were used in the production of that article, the greater part of which 600 gallons, if not the whole, has taken the place of what was generally produced from *illicit spirit.*

In truth, however, no such doubts remained. It was expected that the working of the act would be to lessen the trade of the illicit distiller, and this expectation has not been disappointed. To Mr. Wood, the late Chairman of the honourable Board, the country is mainly indebted for the boon, and he lived to see that he had effected a most important improvement—one indeed of many he had been instrumental in effecting, and which marked him out as an eminently sagacious and clear-headed man, a good servant of the Crown, and an able administrator of the powers his high office placed in his hands. The country owes him a debt of gratitude, and his memory will long be cherished with respect mingled with esteem. But he was not alone; and to his successor, coadjutors, and the official gentlemen, Mr. Dobson, Mr. Young, &c., without whose cordial and hearty co-operation the improvement never could have been accomplished, we may look with confidence for a fair consideration of the various suggestions made for the further extension of this beneficial measure, and for the removal of every impediment in the way of improvement, which their position as guardians of an important branch of the public revenue will permit.

Among the chemical products prepared from methylated spirit, I took occasion, in my former paper, to notice particularly ether and chloroform. To the remarks then made in regard to *ether*, I have little to add. Its employment in the arts is extending, and many photographers find it to answer their purpose as well as that made from pure spirit of wine.

Chloroform is one of those preparations which certainly was not at first expected to be produced in a state sufficiently pure for medical use from the methylated spirit. Drs. Graham, Hoffmann, and Redwood, in their report, thus speak of both these articles :—"Ether and chloroform may be made with the methylated spirit; and when the products have been purified in the usual way, they do not appear, upon a superficial examination, to differ from those made with pure spirit. Upon allowing them slowly to evaporate, however, a peculiar and disagreeable odour becomes perceptible towards the end of the evaporation. This impurity would probably preclude their application for most medicinal purposes, for which they are required to be pure, or at least to be free from any foreign flavour either in taste or smell."

The difficulty, however, has long been overcome, and chloroform has been, and is now prepared from methylated spirit, not only without any "peculiar and disagreeable odour," but as "pure and free from any foreign flavour, either in taste or smell," and as fit for "medicinal purposes" as that from alcohol alone ; and the testimony of a lengthened experience has been added to the evidence of the senses. In addition to the instances which I adduced of the successful employment of chloroform, prepared from methylated spirit, as an anæsthetic, in the performance of operations in the Royal Infirmary, under the eye of Professor Syme, I have been favoured with an account of an experimental inquiry into this subject, made soon after that period, by a Committee of the Royal Medical Society, before which the subject had been brought on the evening of February 15, 1855, by a communication on the use of chloroform made from methylated spirit, which was read by Dr. Sibbald, Resident Surgeon to the Edinburgh Royal Maternity Hospital, containing the results of his experience, which were every way favourable. After some discussion, and in order that the Society might be more fully satisfied on the subject, a committee was appointed "to investigate the properties of chloroform prepared from methylated spirit, with a view to ascertain its anæsthetic value, as compared with that prepared from pure alcohol." The committee gave in their report on the 14th of March, and received the authority of the Society to publish it; and the committee having with great kindness and liberality handed it to me, I have now the pleasure of reading it to this Society, as follows:—

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* *Reports on the Successful Application of Methylated Spirit, &c. &c.* 1856.

"The committee considered that they would best meet the Society's views by endeavouring to determine—

"1st. The quantity of each variety required for the induction of anæsthesia.

"2nd. The time required for the induction of the anæsthesia.

"3rd. The duration and degree of the anæsthesia.

"4th. The subsequent effects.

"In order to ascertain the facts relative to these objects, four gentlemen inhaled chloroform prepared from pure alcohol on one day, and a week subsequently the same gentlemen, all as nearly as possible in the same condition, inhaled chloroform prepared from methylated spirit. The drug was exhibited from a towel in the usual mode.

"1. In the case of the first gentleman—ʒij. chloroform from *pure spirit* were given in the usual mode, and in three minutes afterwards ʒj. Anæsthesia was induced in five minutes. In seven minutes vomiting occurred, during the act of which there was a return to consciousness. The subsequent effects were languor and drowsiness continuing for some time.—ʒij. chloroform from *methylated spirit* were given, followed in six minutes by ʒj. and the induction of anæsthesia. Some sickness came on with attempts to vomit. The subsequent effects were the same as in the preceding.

"2. Second gentleman.—ʒij. chloroform from *pure spirit* were given, followed in three minutes by ʒj., and in five minutes there was anæsthesia. In seven minutes slight moaning and gradual return to consciousness. No subsequent effects.—ʒij. chloroform from *methylated spirit* were given, followed in three minutes and a half by ʒj., and in five minutes there was anæsthesia. In five minutes and a half there was slight moaning, and gradual return to consciousness took place without subsequent bad effects.

"3. Third gentleman.—ʒij. chloroform from *pure spirit* were given, followed in four minutes and a half by ʒj., and in seven minutes there was complete anæsthesia. In nine minutes heard and spoke. Gradual return to consciousness. Subsequent effects, pleasant excitement.—ʒij. chloroform from *methylated spirit* were given, followed in six minutes by ʒj., and in about eight minutes anæsthesia was complete. At the ninth minute he spoke. Gradual return to consciousness. Subsequent effects, pleasant excitement.

"4. The fourth gentleman was found to require more of the drug, and was longer in being anæsthetized than his fellows, owing most probably to his having been more frequently under the influence of chloroform than any of the others. In him anæsthesia was produced several minutes sooner by chloroform from methylated spirit than it had been by chloroform from pure spirit. The duration on both occasions was the same, but the anæsthesia from pure-spirit chloroform was more complete than that from methylated-spirit chloroform.

"The intellectual manifestations in all the gentlemen, while under the influence of the agent, were similar in the same individual at both times of its administration. No difference in the rate of the pulse was observable.

"From these facts the committee were led to believe the action of chloroform prepared from methylated spirit to be the same as of that from pure spirit, in respect—1st. That the quantity of the drug required for the induction of anæsthesia is equal in both instances; 2nd. That the time required for the superinduction of anæsthesia is the same; 3rd. That the duration and degree of the anæsthesia are similar; and 4th, and most important of all, in respect that the subsequent effects are identical. The differences which occur in the use of the two preparations are very trivial, and not more striking than are constantly met with in the administration of chloroform from pure spirit to the same individual at different times. In fact, looking at their effects, it would be said that the two articles appear to be precisely the same, and no doubt they are so; but this point the committee had not to investigate."

The report bears the signature of the convener, Dr. Alexander R. Simpson, who drew it up, as well as of the other members of the committee.

The results, as thus detailed by the committee, cannot but be considered as highly satisfactory. The chloroform employed was not prepared for the purpose, but was the same as in daily use; and as the original prejudice against the use of chloroform made from methylated spirit has not yet altogether disappeared, this publication may therefore be useful at the present time in demonstrating more fully that the one is as pure and safe as the other, so as to lead to its more universal adoption; for thus only can the intentions of the Legislature, in regard to freedom of trade, be fully carried out, and the home manufacturer placed on a level with his continental brethren, so as to stand his ground without the necessity of any protecting duty. When duty-paid spirit of wine was employed in the manufacture of chloroform, a duty on importation of 3*s.* per lb. was found needful, and accordingly imposed. If, however, that prepared from methylated spirit were superseding it entirely, then this duty might be done away, and the Chemists of other countries allowed to enter into competition with those of this country, and so ensure to the community the best chloroform the world can produce. Of a competition of this kind the Chemists of this country need entertain no fears. They have hitherto laboured under great disadvantages in regard to everything which is prepared with alcohol. Now the methylated spirit goes far to put them on a level with their continental brethren, and should the proportion be reduced to five per cent., the difference will be almost, though not entirely, removed.

Before leaving this subject, I may mention that since Dr. Sibbald read his paper on the employment of chloroform prepared from methylated spirit in the Royal Maternity Hospital in February, 1855, it has been regularly employed there ever since in all cases requiring its exhibition, especially cases of long protracted and difficult labours, and also where the application of instruments became necessary. In such cases it was sometimes needful to keep the patient a long time under the influence of the chloroform, but in every case it was employed with complete success, and without a single bad consequence.

I may also notice, in passing, a new candidate for public favour as an anæsthetic which has just started into view,—the amylen or amylene prepared from Fousel oil, the alcohol of amyl $C_{10}\,H_{11}\,O, H\,O$. The details of the experiments made with it I have not seen further than in the columns of a newspaper, so that I am unable to say more than that its effects are reported to have been powerful. Amylen is described by Regnault as obtained by the action of concentrated sulphuric acid on amylic alcohol, also by that of phosphoric acid, fluoboric and fluosilicic gases, and chloride of zinc, and as being a colourless very fluid liquid, boiling at 102.2°.

Spiritus Ætheris Nitrosi.—The next subject which fell to be considered, was the preparation of spiritus etheris nitrosi, but indisposition somewhat protracted having prevented me from proceeding with the subject at that time as I intended, and its manufacture from methylated spirit being now freely permitted and fully established, it seems quite unnecessary to enter upon the subject; I shall therefore confine myself to a few observations on its nature, and the effect which the addition of the methyl to the alcohol has on the article. The mode of its preparation is well known. The different Colleges give different formulæ for preparing it. These have been already adverted to in a communication from Mr. Brown, published in the Journal for February, and need not be further adverted to. Drs. Graham, Hoffmann, and Redwood, in their Report, say:—"We may state with reference to this article, that it is made by distilling a mixture of spirit of wine and nitric acid, and that when properly prepared, it consists of a solution of a small quantity of nitrous ether in spirit of wine. The proportion of nitrous ether present is extremely variable, and in some commercial samples is so small as merely to impart a slight flavour to the spirit." What is prepared according to the directions of the Edinburgh Pharmacopœia has this advantage, that it is of a definite strength, containing twenty per cent. of the nitrous or rather hyponitrous ether in the spirit, and were it not that it rapidly undergoes decomposition, it would supersede entirely all those which are described as "extremely variable" in the proportion of nitrous ether, or possessing only so small a quantity as "merely to impart a slight flavour to the spirit," but the rapidity with which it becomes acid necessarily prevents this; indeed, the Pharmacopœia directs that it "ought not to be kept long, as it always undergoes decomposition, and becomes at length strongly acid," hence it would require to be made from day to day; but as this is impossible in the ordinary way of business, a spirit containing a much smaller quantity is found to be preferred; one containing about the half, or ten per cent., is as strong as will keep for any length of time, and though necessarily weaker, may yet be more to be relied upon than the stronger, which decomposes so much more rapidly.

In preparing the sweet spirit of nitre from the methylated spirit, the same method may be adopted as in preparing it from pure alcohol, and if we suppose the action of the nitric acid to be equally powerful on both its ingredients—the alcohol, the Ae O HO, and the pyroxylic spirit, the Me O HO, then we may expect the resulting compound to contain the respective ethers very much in the proportion in which the respective alcohols exist in the methylated spirit, viz., $\frac{9}{10}$ of the one, to $\frac{1}{10}$ of the other. If the "sweet spirit of nitre" be prepared of the strength directed by the Edinburgh Pharmacopœia, then 100 parts will contain 20 per cent. of the mixed ethers, but if on account of its rapid decomposition the spirit be prepared of half this strength, then the proportion will be as 10 per cent.—nine of the one, and one of the other, while in those of variable strength the quantity will vary with its strength until when the quantity of hyponitrous ether is so small as "merely to impart a slight flavour to the spirit," that of the nitric ether will become small by degrees, and beautifully less. But taking a spirit containing ten per cent. of the mixed ethers as a fair and full proportion, it will contain only $\frac{1}{100}$th of the nitrate of oxide of methyl. The question remains—How far will this affect its medicinal virtues and its flavour as a spirit, the "peculiar and unobjectionable flavour" which "is the popular test of its good quality?"

On the first of these points, which is really the most important, I have submitted the matter to experiment, having tried its effects on myself, by taking repeated doses of two and three drachms in the usual way, without observing any difference in its properties from those of that prepared from pure alcohol; and with regard to the second, this cannot, of course, be obtained, if the ether be first prepared, and then mixed with the methylated spirit; but if the process has been carefully conducted, the flavour arising from the quantity of the ethers, comparatively small as that is, may so far overcome the flavour of the methyl, as to render the sweet spirit prepared from the methylated spirit, if not so "peculiar" as that from pure alcohol, yet sufficiently free from anything disagreeable as to render it available for all medicinal purposes in which the ether has hitherto been employed; and should Government reduce the proportion of pyroxylic spirit in the methylated alcohol to five per cent. instead of ten, as at present, this will be still more fully accomplished.

With a few words regarding the properties of the two ethers which are contained in the sweet spirit of nitre from methylated spirit, I shall conclude. The action of the nitric acid upon alcohol: the hydrated oxide of ethyl gives rise, *inter alia*, to the production of a hyponitrite of oxide of ethyl, the $Ae.O\ NO_3$, while upon methylic alcohol, it gives rise in like manner to a nitrate of oxide of methyl, the $MeO,\ NO_5$. The former boils at a temperature of about 65°, and has a specific gravity of 899.9; the latter boils at a temperature of 151°, and has a density of 1.182 at 72° (Turner). The former is of a pale yellow colour and pleasant flavour; the latter is of a similar colour at first, but after rectification from chloride of calcium and litharge, Turner describes it as a colourless liquid of a faint ethereal smell. What I show you now (Mr. M. exhibited these) was prepared in the course of last week, and after the first distillation was subjected to fractional distillation, which shows that it was by no means a homogeneous fluid—the first portions coming over between from 80° to 140°, in which the flavour of hydrocyanic acid is felt, a flavour ascribed by Turner to the presence of formiate of methyle; other portions from 140° to 150°, from 150° to 162°, in which the chief portions of the ether will be found; and others again up to 212°. What I now show you has stood upon chloride of calcium and litharge for many months; it was prepared in a similar way. It is colourless, has the density of 1180 at 59°, boils at 148°, and is of an agreeable odour. The former, the hyponitrous ether, is not miscible with water; the latter dissolves in it. The vapour of the latter explodes violently when heated above 248°; that of the former disappears at so low a temperature as to prevent this. Mr. M. here exhibited its explosive properties: three drops having been dropped into a small tube covered with wire gauze, it was held in the flame of an ordinary spirit lamp, and in a short time exploded.

The two ethers, though they have thus points of difference, have many in common; and in their properties they appear still more nearly to resemble one another. The hyponitrous ether is powerfully narcotic, diuretic, and perhaps hypnotic. Inhaled in vapour, it produces very decided effects—blueness of the lips, lividity of the countenance, muscular debility, coldness of the extremities, blueness of the hands, and, if inhaled for any length of time, the vapour would undoubtedly prove fatal. I abstain, however, from entering more particularly on its description, in the hope that a more detailed account of its effects will be furnished by a friend, who has experienced them on more occasions than one. I may mention, however, that I have seen them induced by exposure to the vapour of sweet spirit of nitre from alcohol, for a comparatively short time, as in pouring over a quantity of it, twelve gallons from one jar to another. Notwithstanding these powerful effects, the mind remains perfectly calm and unaffected, and recovery takes place without leaving any injurious results. Warmth, stimuli, as ammonia and brandy, and quiet, appear the best means for speedy restoration. The effects of the concentrated nitrate of oxide of methyl not being so well ascertained, I determined to try them. I breathed the vapour for a short time without feeling any effect save a slight headache, which continued for some time. I then took what I thought would be a moderate dose from the portion which had stood so long upon chloride of calcium and litharge, which had the specific gravity of 1180 at 59°, and boiling point of 148°, and which I believe to be nearly pure. Of this I took rather more than ʒss. at half-past five P.M., and sat down to watch its effects. In five minutes the pulse was full and strong, and 80. In ten minutes the same. In fifteen minutes there seemed a rush to the head, the lights became somewhat dim, and the pulse fell. There was no confusion of mind, and I considered whether to allow the experiment to go on further or not, but preferred calling for ammonia, which at once suspended these effects. The pulse then beat 64, and rather weak. The face and hands too became slightly blue, but this soon disappeared under the influence of the ammonia, and in about a quarter of an hour after, I walked home. There was then some slight headache, with coldness of the limbs. These ultimately disappeared in the course of a few hours, leaving no unpleasant effects behind. So far then as I can venture to draw a conclusion from one experiment, I would be inclined to say that the effects were similar to those produced by the inhalation of the hyponitrous ether from alcohol, but not so violent. In particular there was no muscular debility, the blueness of colour was lighter and more evanescent, and the effects altogether of shorter duration. Both ethers, therefore, in their concentrated state, would seem to be powerful and active agents, and in the proportion in which they exist in the spiritus etheris nitrosi, most valuable and useful medicines.

An interesting discussion followed the reading of Mr. M.'s communication as to the purity of chloroform made with methylated spirit, and the unanimous feeling of the meeting was, that, from improvement and care in manufacture, the chloroform from methylated spirit was now as much to be depended upon for all purposes as that made from pure spirit of wine; and a vote of thanks was proposed to Mr. Macfarlan by Mr. Mackay, for his very able and instructive communication. Carried by acclamation.

In the course of the evening reference was more than once made to the new anæsthetic agent, *amylene*, and it was stated that a small quantity had been obtained from London by Messrs. Duncan and Flockhart, and sent to Professor Simpson, with a view to having its relative properties tested; but this sample had unfortunately been laid aside, and, so far as could be ascertained, had not been tried up to the time of meeting.

A paper was then read by the Secretary

ON THE PRESENT STATE OF PHARMACY IN AMERICA.

BY JAMES RAE, DRUGGIST, CHICAGO, ILLINOIS,
Member of the P.S. of Great Britain, and late Sec. of the Stirling School of Arts, Scotland.

In attempting to bring before the Members of this Society a brief sketch of the present state of Pharmacy in the United States, I will confine my observations, for the present, principally to what has been the result of personal experience, knowing well that a marked difference exists betwixt the trade as carried on in the Eastern, Southern, and Western States of this great western world.

It is always interesting to learn of what pertains to our own business or profession, whether viewed as a local or personal matter, or, taking a wider range, what concerns us in the progress of Pharmacy in other countries, either in regard to the *status* of the individuals connected with the profession of Druggist, Apothecary, or Pharmaceutical Chemist—the different methods of doing business—the manipulations of drugs and medicines—or anything else of interest to the lover of pharmaceutical pursuits, and the advancement of that science, which has so important a bearing on the health and physical welfare of mankind.

In the United States, where individuals from all parts of the habitable globe assemble for the purpose of improving their circumstances and bettering their condition in life, we find Druggists from all countries, both learned and unlearned—those who have studied under Liebig, Pereira, Redwood, Christison, and Bache, down to the most illiterate and contemptible specimens of our class, who may have read to a certain extent "Price Currents," but know nothing of Materia Medica, Botany, or Chemistry. We have many Prussians and natives of the other German States here, in the capacity of assistants and employers, who have passed both their first and second examinations in Germany, and who are thoroughly experienced Apothetes. We have the French Pharmacien, who, in many respects, is like the German, having been brought up under the protection and encouragement of government, as far as a knowledge of his business is concerned. I have always found them careful Dispensers and good Pharmaceutical Chemists. The same remark applies, to a certain extent, to the Norwegians, Danes, and Dutchmen, although I have seen some not worthy of being called, in the true sense of the word, an apothecary, from the limited education they had received in the mother country. Of the English, Scotch, and Irish Druggists whom I have met in the States I can speak rather favourably, for, although nothing to be compared with the Deutsche Apothete or French Pharmacien as practical Chemists, still the clerks and men in business whom I have met are far superior to the Americans in point of general information, as regards the preparation of pharmaceutical compounds, natural history, chemical constituents, adulterations, actions, doses, and uses of drugs. I have met one or two Members of the Pharmaceutical Society of Great Britain, occupying the very highest positions as Dispensing Chemists and prescription clerks in several of the drug stores in the Eastern and Western States of the Union. Irish Druggists are quite numerous, but I have only seen one Scotchman besides myself in any drug store in this country. Of the Americans I cannot, but with few exceptions, speak approvingly, from the fact that, while they possess in the large towns the richest and most gorgeously fitted-up stores I ever witnessed (far surpassing anything of the kind in Paris, London, or Edinburgh), whlch are, at the same time, conducted by men of education, and in many instances by Pharmaceutical Chemists of the highest standing, still, when I come to speak of the *majority*, I say most unequivocally they are the worst specimens of our profession, as far as knowledge of their business is concerned, that could exist, or do exist, consistent with my observation. In the first place, I may say, with all safety, that ten out of twelve that keep drug stores in America have neither served an apprenticeship nor been educated for the business. I have found farmers, plasterers, cloth merchants, grocers, and men of other businesses foreign to Pharmacy engaged in the sale of medicine, when they did not know one drug from another in their shop unless it was labelled. It is here a mere matter of trade to start a drug store. The principal necessary is money and brass, *not education*. The integrity of the art has been sacrificed to the spirit of mammon; and, with the exception of a few in the large towns who do a legitimate business, we daily witness the most unworthy annexations made to the apothecary shops from the domain of the bar-room, the tobacconist, the confectioner, and the quack; and to such an extent sometimes as to obscure the very identity of the place, and to deprive us of the innocent amusement which we have derived from some absurd inquiry for an article foreign to our business. This is no longer an absurdity in the Western States, for there is scarcely anything, from an asafœtida pill to a toothpick, from a box of window glass to a hair pin, from a keg of white lead to a fiddlestring, from a pint of brandy to a cigar, that you cannot obtain at the apothecary's, either at the present moment or eventually, if you ask for it often enough. I have been both in the wholesale and retail departments of the business here. The principal wholesale business houses are centred in New York, Boston, and Philadelphia; some of these, I am credibly informed, make sales to the enormous amount of two millions of dollars annually. In Buffalo, Chicago, and St. Louis, there are also several extensive firms engaged in the wholesale exclusively; and I know of several houses in Chicago that do business to the amount of two hundred thousand dollars a year. That business is nearly all done by letter, or a personal visit of the customer to the drug house, as they do not, in but very few instances, keep a traveller on the road, as is done in Britain. In addition to all drugs, perfumery, brushes, toilet articles, and patent medicines usually kept in a drug store, we find in every wholesale house in America immense piles of window glass, thousands of kegs of white lead, putty, and all manner of paints and oils, the glazier and paint business being principally in the hands of the Druggist here. Every imaginable size of glass is put up in wooden boxes by the glass houses in Pittsburg and New York, from 6×7 to 52×40, fifty panes in a box—the window glass not coming in huge crates, as in England, but is cut to the desired sizes at the glass works. The white lead in oil is put up in 25 lb. kegs at the manufactories in St. Louis, Buffalo, and Chicago; and, like the window glass, is an article of very large consumption, from the fact that most of the houses in America are built of wood, and, in a new country like this, are built in immense numbers. Another article is sold by the Druggists here, which meets with no restriction, either by license from government or local authorities—pure brandy, wines, and liquors being oftener asked for in a drug store, even in the State of Maine, than Alexandrian senna or Epsom salts. The plea is purity of the article sold for medicinal purposes, but it is as often, I believe, sold as a beverage as for sickness. Alcohol, or spt. vini rect., is a considerable article of commerce in the drug store, from the fact that it is used extensively for cooking purposes, and also as a burning fluid for lamps, in combination with camphine or pure ol. terebinth., four parts of the former to one of the latter, which gives a better light than candles or naphtha, and is cheaper here, there being no duty on alcohol. I can buy it for 75 cents (or 3*s.* of English money) a gallon, and sell about a barrel of the spirit gas, as it is called, at one dollar a gallon retail nearly every day. Wholesale houses are always well conducted, commercially speaking, although many of the heads in the largest firms know nothing but buying and selling and making a profit, which they do in most instances pretty successfully. Fair dealing is the rule, although adulteration is carried on by some unprincipled persons in the trade to a large extent. Clerks or Assistants are paid from £60 to £250 a year; smartness in putting up a parcel being more a requisite by the employer than a knowledge of drugs in every case under my observation.

Turning to the retail department of our business, we find, in the large towns, handsomely fitted-up stores, marble floors, marble counters, marble vases, and marble fountains, plate-glass windows, plate-glass show-cases, costing as high as £100, costly mirrors, and everything attractive in the shape of painting and decoration; stores conducted by men of the highest education and practical experience as Pharmaceutical Chemists, such as Hegeman & Clarke, J. V. Rushton, and others, of New York; S. Mathews, of Buffalo; J. H. Reed, of Chicago; and many others whom I could name, if it was not invidious to do so. These, and others in all the large towns, are ornaments to the profession that they are engaged in, being thorough Pharmaceutists. The business is conducted in every respect equal to any in London or Edinburgh. In almost every instance in large towns, the Physicians receive prescription blanks (I send a specimen) from the Druggists, with the doctor's office printed on one side, and the number and street of the drug store on the other side. This arrangement answers the purpose very well; it gives publicity to the doctor's address, and he has the privilege of sending his patients to a person who has his confidence, as a dispenser of pure medicines, with accuracy and proper regard to their pharmaceutical preparation, as laid down by the United States Pharmacopœia. In small towns and villages, Physicians generally prepare their own prescriptions, but in large towns the Physician prescribes and the Druggist dispenses. In looking over my file in the prescription record, I see I have put up in the last five months 2052 prescriptions, ranging in price from ten cents to two dollars, or from fivepence to ten shillings of English money. The prices charged for prescriptions are usually a shade higher than in Britain; one dozen pills, although only pil. rhei or pil. hydrarg. we charge 1*s*.; powders of calomel and Dover's powder, and such like, are charged 2*s*. 6*d*. a dozen; with quinine or other expensive chemical entering into their composition, they are usually double the price; for a ℥ij box of ointment we are paid ten cents, or fivepence; lotions and washes are usually figured upon at sixpence an oz.; tinctures invariably sixpence an ounce; and everything else dispensed has a nearly corresponding price. In almost every prescription store (the word store may appear strange, but it is invariably used here) they have what they call a prescription case, nicely arranged as a miniature Druggist's shop, stained or cut glass in front and sides, where everything commonly used in a prescription is kept in small bottles, which obviates the necessity of the clerk or assistant running all over the store for every little thing wanted. You probably see there, in the lower row of shelves, a complete selection of Tilden's extracts, prepared in vacuo from the plants grown in their extensive gardens at New Lebanon, in the State of New York. These extracts are put up in the solid form in ½℔ and 1℔ wide-mouthed bottles, neatly corked, and covered with a green-papered box, labelled with the Latin and common name of each extract. I have examined several extracts prepared by the Messrs. Tilden, both in pilular and compound fluid extract form, and have always found them to possess the necessary requisites, purity in the preparation, with the colour, taste, and aroma peculiar to each plant. In their gardens at New Lebanon they have upwards of forty acres cultivated under their immediate superintendence, somewhat in the following arrangement:—Ten acres in Taraxacum, two in Conium, three in Hyoscyamus, three in Belladonna, three in Lettuce, three in Sage, two Summer Savory, two Stramonium, two Burdock and Dock, one Marjoram, two Digitalis, two Parsley, Poppies, and Horehound, one Aconite and Balm; the remainder being Basil, Button, Snakeroot, Blessed Thistle, Borage, Coriander, Feverfew, Hollyhock, Hyssop, Larkspur, Lovage, Marsh Mallow, Marygold, Mugwort, Mint, Tansey, and several others, which are used in America, but comparatively little in Britain. They have a large factory, employing about forty persons, with a powerful steam-engine, which performs the double duty of propelling the powdering apparatus, and driving a double-acting air-pump connected with their vacuum apparatus. The recent plants intended for extracts are brought to the mill from the gardens, reduced to a coarse pulpy state by a pair of chasers, and subjected to a powerful screw press to extract the juice. This is clarified by coagulation, strained, and the pure juice poured into the large vacuum apparatus, holding several hundred gallons, where it is concentrated rapidly to a syrupy consistence, at a temperature varying from 100° to 110°, almost entirely free from the deteriorating influence of the atmosphere.

I may some time have an opportunity of sending to the Pharmaceutical Museum specimens of the various extracts, as also specimens of American herbs and roots, put up by a peculiar community called "Shakers," who have three gardens at New Lebanon.

But to return to our miniature drug store, the prescription case: we have every preparation of mercury, iodine, potash, quinine, iron, &c., with tinctures, waters, acids, and syrups; scales, spatulas, labels, and corks; record and library of reference, such as the *U. S. Dispensatory*, edited by Wood and Bache; Christison, Pereira, Gray, Brande, Turner, Domglison, &c., all concentrated into one spot, where we can lay our hands upon them in a moment, and are seldom under the necessity of running all over the store for everything wanted; but in ten cases out of twelve we receive the prescription from the patient or customer, and in a few minutes the medicine is returned, put up, sealed, labelled, and recorded, without stirring from the prescription-case. Physicians' prescriptions are always written in Latin; but with one or two exceptions, Latin is seldom used for the direction: and upon the whole I think this is right, for falling into the hands of inexperienced clerks, "cap. cochl., ij. ampl. 4ta q.q. hora," might mean something very different from "two tablespoonfuls every fourth hour," and placed in the hands of an *illiterate dispensing Chemist*, who does not know P. Opii. from Pulv. Rhei, might lead to serious consequences. Medicines specially prepared for the prescription trade are with few exceptions, always as chemically pure as those manufactured in London or Edinburgh, but I once found traces of corrosive sublimate in calomel, prepared by a distinguished manufacturing house in Philadelphia, which stands deservedly high as manufacturing Chemists, and from which our supply of quinine, morphia, &c., mostly used, comes. In addition to Lubin's, Henry's, Low's, and Wright's perfumery in great variety, a large show-case is usually devoted to patent medicines and quack nostrums, some of them of English importation, but for the most part peculiarly American. The report on quack medicines, presented to the American Pharmaceutical Association some time ago, made the following announcement:—"The tendency to take medicine *ad libitum* is a feature of the Anglo-Saxon race, duly inherited by the American people, which, whatever may be its faults, is as much their nature as is their love of political and personal freedom." To which the editor of the *New York Journal of Pharmacy* remarks, "If by this is meant, that that portion of the human race designated is addicted to dissipation with medicine, it is a grave charge, and to me a new one, although I have heard them often accused of beer-drinking and gluttony; but if men will not be dissuaded from error, even let it be so." In every drug store in the United States you see old Benjamin Godfrey staring at you from the shelves, together with Bateman's Drops, Holloway's Pills, and Harlem Oil. As for classifying or giving you a list of American humbugs, that is a hopeless task—what with Chologogues, Cherry Pectorals, Tricopheroms, Kaitherions, Mexican Mustaing Liniment, and an innumerable host, some good and some not worth anything; still they form a considerable item in a druggist's stock, and are for the most part saleable, for two reasons—that they are well advertised, and recommended by the Druggist at all hazards of reputation for the sake of a sale. Another important item connected with the drug business in America is the soda-water trade during the summer months, not bottled as in Britain, but drawn from the fountain. Almost every Druggist has a soda water machine, either Swan's, Nichol's, or some other machine. The fountains are either copper or iron, capable, in most instances, of holding four or five hundred glasses of soda water, or rather carbonized water; perhaps a dozen syrups, such as pineapple, strawberry, raspberry, vanilla, lemon, ginger, cream, pear, banana, &c., &c., are ready in different bottles to meet the varied tastes of the soda drinkers, which are innumerable in a hot summer's day, with the thermometer standing at 90° in the shade, the water being cooled by means of a refrigerator packed in ice. The syrups are all made from artificial essences, imported from Germany and London, although some are made in this country; but seldom or ever does it happen that the real fruit is used, from the fact that, made in large quantities, it soon ferments with the heat, and is therefore unfit for use.

There are a few other peculiarities of American Pharmacy which might have been mentioned, but for the present I must forego, as I have endeavoured to be instructive rather than tiresome—to be honest rather than prejudiced—to express, in my own language, what I have seen, rather than that I have heard. If I have erred in any one particular, it is from no desire to either praise or condemn, but simply to impart some information on the present state of American Pharmacy.

Mr. Macfarlan had much pleasure in listening to the graphic account of the drug trade at present existing in America, as described by Mr. Rae, on which, however, the late hour of the evening would preclude his making any remarks. He thought, however, that the Society was much indebted to Mr. Rae, and proposed that the Secretary should be instructed to enter in the minutes, and intimate a special vote of thanks to Mr. Rae for his communication. After some remarks by Mr. Mackay, this was carried unanimously.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

Abstract of paper, read December 4th, 1856, by Dr. Nevins, on

SLOW POISONING BY ANTIMONY.

Description of Experiments.—The animals experimented upon were rabbits, ten of which were healthy and vigorous, whilst one was puny and feeble. Dry tartar emetic was administered to each four times a day, in doses of half a grain, a grain, and two grains respectively, in order to ascertain the effects of different quantities; and they were killed from day to day by a blow, until they began to die from the effects of the poison, in order to observe the morbid appearances produced day by day. They had food in abundance, and were kept in a large and airy hay-loft.

Amount of Antimony given, and period of Administration.—The smallest amount which produced death was twelve grains, which were given in four days to the delicate rabbit above mentioned, and the next fatal case was caused by twenty-one grains in five days. After this, no rabbit died for a week, the next fatal case being after forty grains, given in twelve days. The largest amount given was seventy-three grains, and this caused death in seventeen days. The fatal quantity, therefore, ranged from twelve to seventy-three grains, and the period requisite for causing death, from four to seventeen days.

General outline of Symptoms during Life.—For the first few days no striking symptoms were evident, but after this the animals lost their spirit in a great degree, and gradually became emaciated. In some of the later cases the emaciation was extreme. They continued to take food until almost the hour of death, but the amount eaten in the day fell at last to less than half the quantity consumed before the commencement of the poisoning. None of them vomited, for rabbits are incapable of this action; and in the earlier animals killed by the poison, there was an absence of diarrhœa, whilst this symptom was present in all those which lived beyond the tenth day. Cramps were not present in a single instance, but several of them died in violent convulsions, which lasted from a quarter to half an hour, before death put a period to them. The mouth was severely ulcerated in several of them, from the local action of the tartar emetic, whilst being introduced into it. One of the rabbits proved to be with young, and continued to increase in size and weight for about a fortnight, after which all motion ceased in the belly. She lost weight and flesh, and died whilst giving birth to the sixth of a litter of seven dead immature fœtuses.

General Pathological Appearances.—In many of the rabbits killed, the morbid appearances were insufficient to account for death; and although several organs were evidently affected by the poison, the amount of diseased action was trifling. In the later cases, however, the pathological appearances were generally strongly marked. Their general outline was as follows:—*Emaciation* sometimes extreme, so that not a trace of fat remained in the body. *Mouth* ulcerated. *Stomach* frequently inflamed in patches, but not throughout; sometimes, but rarely, ulcerated; always more than half full of food. *Pylorus* frequently so thickened and indurated as to resemble cartilage under the knife. *Small intestines* frequently inflamed in patches, but very rarely ulcerated. Intestinal glands sometimes excessively enlarged, and deeply coloured by sulphuret of antimony. *Large intestines* frequently empty, but seldom presenting any diseased appearance. *Liver* generally congested in parts; occasionally inflamed; hard, or brittle. *Kidneys* generally more or less congested, but never alike in this respect; sometimes one only; and sometimes the upper portion of one and the under portion of the other. *Bladder* generally distended with urine, and more vascular than usual. *Brain* seldom examined; healthy. *Lungs* and *Trachea* frequently congested; sometimes *highly* inflamed; the two lungs seldom alike. *Heart* healthy; generally full of black, coagulated blood. In several cases there was *extensive extravasation* of *blood* upon the surface of the lungs and of the liver and stomach, and beneath the mucous coat of the cœcum.

Distribution of Antimony in the Tissues.—It was always present in the *liver* after five grains had been given, and it appeared in this organ before it was clearly proved elsewhere, except in the coats of the stomach, about which some doubt existed, as to whether its presence there might not be owing simply to adhering antimony. It appeared next in the *kidneys*, and after the fifteenth day it was present in the *bones*. Its presence was also easily proved in the *blood* and *lungs*, the *urine*, and the *fæces*, both hard and soft. In the *brain* it was never clearly present, and its evidence in the *muscles* was very slight.

Elimination from the System.—The antimony was constantly passing off by the urine and the fœces, and it was discovered in both these excretions abundantly in some rabbits which survived twenty-one days after the last dose of antimony had been given; and in the fœces it was slightly present thirty days after the last dose.

It disappeared from the liver before the fifteenth day, and from the kidneys somewhat later than this; whilst it was found abundantly in the bones thirty-one days after the last dose had been given.

Effects upon the Fœtus in Utero.—The whole litter, consisting of seven young ones, was killed by the poison a day or two previous to the death of the mother, and antimony was found in abundance in the placentas and livers examined separately; in the remaining contents of the abdomen, examined in a mass; in the contents of the chest, also examined in a mass; and, lastly, in the remaining flesh and bones of several fœtuses, which were well washed after all the viscera had been removed.

Chemical process adopted.—The solid organs were reduced to a semi-fluid state by pounding them in a mortar when requisite, and then boiled for five or ten minutes in pure fuming muriatic acid, or until they were dissolved, along with bright slips of copper. The materials and copper slips were then set aside for twenty-four hours, and the comparative amount of antimony was estimated by the comparative effect produced in this period of time. The antimony is often very slowly deposited, and several hours are frequently necessary before any decided effect is produced when the metal is present in small proportion.

THE PRESIDENT, MR. ABRAHAM, IN THE CHAIR.

Thursday, 15th January, 1857.

Messrs. S. K. Russell, S. M. Morris, and J. H. Ellerbeck, were elected Members, and Messrs. Moses and Wall Associates, of the Society.

The SECRETARY announced donations to the Library and Museum from Messrs. S. K. Russell; R. Sumner & Co.; Clay, Dod, & Case; Cumine; R. & H. E. Benson; J. C. Braithwaite; J. T. Davenport; Jos. Ince; Edw. Evans; W. Balmer; Bailey & Wills; Gamble & Son; Evans, Sons, & Co.; J. W. Taylor; J. H. & S. Johnson; Clay and Abraham; the Museum of Applied Science; and himself.

Dr. Edwards exhibited metallic arsenic, precipitated upon copper foil, which he had obtained by analysis of the tissues of the body in a recent case of arsenical poisoning. Five children had suffered from the effects of poison, three of whom died the same day. The other two had partially recovered, and he had examined the urine of one child that day, and found arsenic in it. In only one case could arsenic be detected in the stomach, and he had no doubt it had been taken in very small quantities and in repeated doses; and there appeared to be some reason to believe that the source of the poison was coloured sweetmeats, of which the children had freely and frequently partaken.

Mr. Mercer laid before the meeting the results of an examination he had made of the "Rivington Pike Water," with which the town of Liverpool is about being supplied, and which is at present the source of considerable local excitement.

His remarks were followed by a long and spirited discussion, in which the Chairman, Dr. Edwards, Mr. Mackinlay, Mr. Jeffery, and other gentlemen present, joined.

ORIGINAL AND EXTRACTED ARTICLES.

ON STORAX.

BY DANIEL HANBURY.

> "Verum ad accuratam ac diligentem Materiæ Medicæ tractationem instituendam, remedii cujusque historiam et virtutes à medicis recensitas exponere non sufficit; sed etiam multa insuper consideranda sunt ac perpendenda."—GEOFFROY, *Tract. de Mat. Med.*

WRITERS on Materia Medica, ancient as well as modern, have generally concurred in applying the name *Storax* or *Styrax* to two distinct substances namely *Liquid* and *Solid* Storax. I might almost say to two *groups* of substances, since each comprehends two or more varieties.*

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* A conventional distinction of confining the name *Storax* to the *solid* drug and *Styrax* to the *liquid*, is adopted by some modern authors. But as such a use of terms leads to some inconsistency, I have not adopted it, but employ the word *Storax* as the English equivalent of the original Greek word Στύραξ.

The plant to which Storax, at least the solid kind, is commonly referred, is *Styrax officinale* Linn., a small tree of the Nat. Ord. *Styraceæ*, occurring in Provence, Italy and the Levant. It is this tree, to which all authors admit, the account of Storax given by Dioscorides in the first century, refers.* In fact, it is not unreasonable to suppose that a tree so nearly allied to that producing Benzoin, should be capable of affording an analogous product.

That it may under certain favourable circumstances exude a fragrant resin, even in France and Italy, we know from the positive testimony of two authors, the first of whom, Duhamel, has written in these words:

> "J'ai trouvé en Provence, près de la Chartreuse de Montrieu, sur de gros Aliboufiers, des écoulements assez considérables d'un baume très-odorant. Il n'est pas douteux, ce me semble, que ces Aliboufiers ne fournissent du Storax." †

The second author is the Abbé Mazeas who, in a communication under date 18 Jan. 1769 addressed to the *Journal des Sçavans*,‡ states that on a plain in the neighbourhood of Tivoli, near Rome, sheltered on the N. and N.E. by a chain of mountains contiguous to Monte Genarro, Rocca Giovane, S. Polo &c. which form a semi-circle open to the south,—in fact, in a very warm situation, the *Styrax* shrub yields by incisions in its bark, the valued exudation known as *Styrax en larmes*.

As the account of Storax left us by Dioscorides, who was a native of Cilicia, one of the countries affording the drug, is important, I will here give its literal translation, subjoining in a note the Latin text of Sprengel,§ the latest commentator upon that author.

> Storax is the exudation of a certain tree resembling a quince-tree. It is preferred yellow and shining, resinous, having whitish lumps, retaining for a long period a very grateful odour; when softened, it emits a certain honey-like humidity. Such is the Gabalite, the Pisidian and the Cilician [Storax]. That of bad quality is black, friable and branny. There is also found an exudation resembling gum, transparent, myrrh-like; but this is produced rarely. Storax is adulterated with the powder of the tree itself, made by the erosion of little worms, honey and the dregs of iris ‖ and some other things, being added. There are those who pound with storax in very hot weather, either wax or tallow imbued with aromatics, and press it through a strainer having wide openings, into cold

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* Perhaps I ought to except Professor Orphanides of Athens, who has hinted that the text of Dioscorides on the subject of Storax, requires correction. *Bulletin de la Société Botanique de France*. T. iij. p. 147.

† *Traité des Arbres*. Paris, 1755. 4to. T. ij. p. 289. Montrieu or Montrieux is a little place about 10 miles to the north of Toulon, in the department of the Var. In this neighbourhood, the *Styrax* grows wild.

In order to endeavour to obtain an authentic specimen of the exudation of *Styrax officinale*, I wrote to my friend Dr. Planchon of Montpellier, who at my suggestion kindly caused incisions to be made during the hottest part of last summer, in the trunk and branches of a large and fine *Styrax* growing in the Botanic Garden there. The experiment was quite unsuccessful: neither aqueous sap nor resinous juice flowed from the incisions.

‡ Vol. for 1769, p. 105.

§ "Styrax lacrima est arboris cuiusdam cydoniæ similis. Præfertur flavus ac pinguis, resinosus, grumos habens albicantes, quam diutissime in odoris gratia permanens, quique dum mollitur, melleam quamdam humiditatem ex se remittit. Talis est gabalites, pisidius ac cilicius. Deterior niger, friabilis ac furfurosus. Invenitur et lacrima gummi similis, transparens, myrrhæ æmula; verum hæc raro nascitur. Adulterant autem arboris ipsius scobe, vermiculorum erosione facta, admisto melle et iridis crassamento aliisque nonnullis. Non desunt, qui et ceram aut sebum aromatis imbutum ad solem acerrimum cum styrace subigant et per colum latis foraminibus pervium in aquam frigidam, quasi vermiculos effingentes, exprimant et venumdent, quem styracem ideo vermiculatum appellant. Imperiti eum tanquam sincerum admittunt, non attenti ad odoris insignem vehementiam. Est enim admodum acris, qui fraudis expers est. * * * " Pedanii Dioscoridis Anazarbei *de Mat. Med. Libri* V., ed. Curt. Sprengel. Lips. 1829, 30. T. I. p. 82 (lib. 1. cap. LXXIX.).

‖ Possibly some residue obtained in making the preparation called *Irini spissamentum*. described lib. I. cap. LXVI.

> water, forming as it were, little worms: they sell this, which they call *vermiform Storax*. Inexperienced persons admit it as genuine, not regarding its remarkably powerful odour: for that which is not fraudulent, is somewhat strong.

The particulars given by Pliny in his chapter on Storax, are very minute and xplicit, although his supposition that the drug packed in reeds was a natural production and his notion of it being attacked by insects, must be regarded as erroneous.

The following is Pliny's account:

> "That part of Syria joining up to Judæa, and lying above Phœnicia, produces *Storax*, which is found in the vicinity of Gabala and Marathus, as also of Casius, a mountain of Seleucia. The tree bears the same name and has a strong resemblance to the quince. The tear has a harsh taste, with a pleasant smell; in the interior it has all the appearance of a reed, and is filled with a liquid juice. About the rising of the Dog-Star, certain small winged worms hover about this substance and eat it away, for which reason it is often found in a rotten state, with worm-holes full of dust. The Storax next in estimation after that already mentioned, comes from Pisidia, Sidon, Cyprus and Cilicia; that of Crete being considered the very worst of all. That which comes from Mount Amanus, in Syria, is highly esteemed for medicinal purposes, and even more so by the perfumers. From whatever country it comes, that which is of a red colour is preferred, and it should be both unctuous as well as viscous to the touch; the worst kind is that which crumbles like bran, and is covered all over with a whitish mould. This substance is adulterated with the resin of cedar or with gum, and sometimes with honey or bitter almonds; all which sophistications may, however, be detected by the taste. The price of Storax of the best quality is seventeen denarii per pound.* It comes also from Pamphylia, but this last is more arid and not so full of juice."†

The localities here mentioned, include those cited by Dioscorides: and most of them can be identified. Gabala is the modern village of Djebeleh, a few miles to the south of Latakia. The ruins of Marathus still exist. Casius and Amanus are mountains near the Gulf of Iskenderun, still to be traced under Turkish names. The position of the ancient countries of Pisidia, Pamphylia and Cilicia in the south-eastern part of Asia Minor is well known; and Sidon, Cyprus and Crete are familiar to all. In several of these localities, *Styrax officinale* is, at the present day, a common wild shrub.

The drug thus described by these ancient authors, is that which I conceive to be the original and legitimate Storax, namely a fragrant resin in separate, or more or less agglutinated tears, somewhat resembling Benzoin, exuded either spontaneously or after incision, from the trunk of the *Styrax officinale* of Linnæus. That such a drug in a state of greater or less purity, was in former, and even in comparatively recent times, an article of commerce, appears certain from the specimens still existing in a few old collections of Materia Medica, as well as from the descriptions of the best Storax given by the pharmacologists of the last century agreeing very fairly with the account left by Dioscorides.‡

This fine kind of Storax, always extremely scarce, was called *amygdaloid* from the small, white, almond-like tears of which it partially consisted. It also bore the name *Styrax calamites*, a term derived from the ancient method of packing it in reeds (*calami*).§ It has however, wholly disappeared from commerce, its name alone *Styrax calamites* or *calamita* being retained in favour of that odoriferous, sawdust-like compound which we are accustomed to find in the shops. In France, it is applied to a black, extractiform, odoriferous substance which I shall more particularly describe in a future paper.

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* Equal to 16*s*. per lb. avoirdupois.

† Pliny's *Natural History*, Bostock and Riley's translation: Book xij. Chap. 55.

‡ See especially Kirsten, *Exercitatio de Styrace*, Altorf, 1736. 4to.

§ According to Matthiolus, the allusion to *Calami* in connexion with Storax first occurs in Galen. I find the passage to be as follows:

"Manifestum insuper est Styracem qui in calamis è Pamphiliâ apportatur, Andromachum præcipere. Paucissimus autem illic styrax nascitur: tantumque ab hoc vulgari distat, quantum à vino quod in tabernis venditur Falernum." (Galen. *De Antidotis*, lib. i. cap. 14.)

The term *Calamites* has been supposed to be derived from καταβαλίτης, a vulgar reading for γαβαλίτης, as explained at length by Matthiolus (*Comm. in lib. I. Dioscorid.* cap. LXVIII.)

Although we possess no modern account of the collection of solid Storax, confirmatory of that given by Dioscorides, other than those I have quoted (which do not, however, relate to collecting the drug for the purposes of commerce), there exist two remarkable statements of the method of collecting *Liquid Storax*, which it will not be unprofitable to examine with some attention. I ought however, first to state that it is questionable whether the Greeks were acquainted with *Liquid Storax:* Arab writers on the other hand, distinctly mention it, though their accounts are far from satisfactory and clear.[*]

The first of these two statements is that of James Petiver, an apothecary of London, who was noted as the possessor of a considerable collection of objects of natural history.

In the year 1708, that is ten years before his death, Petiver presented to the Royal Society of London a communication which, *verbatim et literatim*, is as follows:

> " *The Manner of making* Styrax liquida, *alias* Rosa Mallas.
> *Communicated by Mr.* James Petiver, *F.R.S.*
>
> *Rosa Mallas* grows upon the Island *Cobross*, at the upper end of the *Red Sea* near *Cadess*, which is 3 days Journey from *Suez*: It is the Bark off a Tree (taken off every Year, and grows again) boiled in Salt Water till it comes to a Consistence like Bird-lime, then separated and put into a Cask and brought to *Judda*, and so to *Mocha* in *June* and *July*, where it sells from 60 to 120 Dollars *per* Barrel, according to its Goodness: the best is what is freest from Clay and Dirt, which is commonly mixed with it; and the way to try it is by washing it in Salt Water which will cleanse it: The *Arabs* and *Turks* call it *Cotter Mija*.
> N.B. *A Barrel is* 420 l."[†]

A statement so precise and circumstantial was received with more or less credit, and we find it quoted by Geoffroy,[‡] Hill,[§] Alston,[‖] Mérat and De Lens,[¶] Martiny,[**] Guibourt,[††] Pereira,[‡‡] Royle,[§§] &c.

Hill, indeed, quaintly remarks, " it is a little unlucky that nobody has given us any description of this *Rosa Mallas*."—But is *this* the only ambiguity? Let us first ask,—*Does there exist any island of* Cobross *at the upper end of the Red Sea?*

Thanks to the excellent chart of the Red Sea made from the surveys of Messrs. Moresby and Carless in 1830–33, and to the minute *Sailing Directions for the Red Sea*, both published by the Hon. East India Company, we have a mass of very exact and positive information relating to its coasts, and to its islands from the largest, down to the very rocks and shoals. Now Petiver makes his island of *Cobross* to be " *near Cadess, which is 3 days journey from Suez.*" To what distance we ought to consider this to be equivalent, I know not; but it is evident from the chart already referred to, that there is no island in the Red Sea nearer to Suez than about 160 miles. Neither this island, nor any other in the Red Sea, bears the name of *Cobross*, or any other name which can be supposed epresent it,—that is, so far as my researches have gone, and I have taken ch pains in investigating the subject.

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[*] Avicennæ *Liber Canonis*, lib. II. tract. 2. cap. 431. 600. 623. (ed. Venet. 1564.)

[†] *Philosophical Transactions*, 1708–1709. Vol. xxvi. p. 44.

[‡] *Tract. de Mat. Med.* (1741), T. II. p. 493.

[§] *History of the Materia Medica* (1751), p. 713.

[‖] *Lectures on the Materia Medica* (1770), Vol. II. p. 418.

[¶] *Dictionnaire de Matière Médicale*, T. IV. (1832), p. 128.

[**] *Encyklop. d. med.-pharm. Nat. u. Rohwaarenk.* Bd. I. (1843) p. 94.

[††] *Histoire des Drogues Simples.* T. II. (1849), p. 294.

[‡‡] *Elem. of Mat. Med.* Vol. II. (1850) p. 1216.

[§§] *Manual of Mat. Med.* (1853) p. 639.

gain,—are there any islands in the Red Sea extensively wooded, as Petiver's ount would lead us to suppose? On this point, the minute information in *Sailing Directions*, is entirely of a negative character.

istrusting my own judgment in such a question, I applied to John Walker, ., Geographer to the Hon. East India Company, and to the Rev. Charles ster, author of the *Historical Geography of Arabia*, gentlemen whose ac- intance with sources of information on such matters, might, I thought, gest some explanation of Petiver's statement: but neither of them has been e to throw any light upon it.

lthough I am unable to find a *Cobross* in the Red Sea, I must state that Ierbelot in his *Bibliothèque Orientale* gives *Cobros*, as a synonym of *Cyprus:* also, that Pliny mentions an island of *Coboris* or *Covoris*, which has been itified as one of the Sohar Isles, near Burka, a town situated on the East st of Arabia, near the entrance to the Persian Gulf.* The position of either these islands is, of course, perfectly irreconcilable with that of Petiver's *ross.*

t is somewhat surprising that of the many authors that have quoted Petiver's ount of *Liquid Storax,* none appears to have been struck with the fact that drug is not said to be conveyed from "Cobross" to Europe, but that it is *rought to Judda and so to Mocha,"*—that is to say, it is carried to a spot some 0 miles south of Suez.

o much for the fallacies in Petiver's account of "The manner of making *rax Liquida.*" In a future part of this notice, I will endeavour to show what es of truth it contains.

he next statement on which I propose to offer some remarks, is that of . X. Landerer of Athens, as contained in a communication published in chner's *Repertorium* for 1839.†

his communication, I translate thus:

> The Storax plant, *Styrax officinalis* is found in various parts of continental Greece, as well as in some of the islands of the Archipelago. There however, it forms but a small shrub and does not possess the agreeable odour ascribed to it by botanists. The bark of the plant occurring in Greece, has not the slightest odour, which probably is due to neglect in cultivation. On the contrary, such is not the case with the plant as found in the Turkish islands of Rhodes and Cos, and especially with it as cultivated by the people of Cos. (*a*)
>
> As I obtained some time since in Syra from a merchant coming from Rhodes some information on the subject, I will make it public, not doubting that, though but little, it will be acceptable.
>
> The Storax plant is called in Cos and Rhodes *βουχοῦρι* (*buchûri*). At its flowering season, it fills the air with the most agreeable vanilla-like perfume. At the period for the collection of the bark and younger twigs, which are employed for the preparation of *Buchuri-jag*, i. e. *Styrax-oil* (*oil* being called in Turkish, *jag*), permission is obtained from the Pasha residing at Rhodes, a small sum being paid for it. Those who are provided with the permission to collect, now make with small knives longitudinal incisions and peel off from the stem the fresh pieces of bark in the form of little narrow ribbons. Owing to their adhesive juice they easily stick together [*backen sie leicht zusammen*]; from them are formed masses of one *oke* weight (= 2lbs.), which are reserved for the preparation of *jag*, or are immediately purchased by Rhodian merchants and sent to Rhodes.
>
> The preparation of *Buchuri-jag* is effected by merely pressing the before-mentioned masses in presses somewhat warmed, called *Styrakia*, and not by

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Forster's *Historical Geography of Arabia*, Lond. 1844. Vol. ij. p. 230.

Einige Worte über die Gewinnung des Storax liquidus vom Prof. und Leibapotheker X. derer in Athen, *Buchner's Rep. für d. Pharm*, Bd. 18. s. 359-362.

> boiling. The *jag* obtained by gentle pressure is of an unctuous consistence, a light grey colour, and diffuses a very agreeable vanilla-like odour. This is the only sort that is exported; but in Cos and Rhodes, it is also used in the preparation of a very odoriferous mass made by the addition of finely-powdered Olibanum and formed into cakes of the size of a fist, which are called *Styrakia*. The preparation of these masses belongs exclusively to the conventual clergy, who distinguish their manufacture with the convent seal.
>
> By repeated warming and stronger pressure, an almost black *Buchuri-jag* is obtained, which is used by the inhabitants themselves for the most healing ointments and medicines.
>
> The bark remaining after the expression of the *jag* is bound together and conveyed partly to Constantinople and partly to Syra and there used for fumigation.
>
> With regard to the decoction of the bark and the adulteration of Styrax-balsam with turpentine, the Rhodian merchant assured me that they would not know how to go about it; and that the adulteration with turpentine, might, in case of detection, involve even the punishment of death.
>
> [Note *a*.] The Storax trees appear at that place to be of important value, and are given to the young women as dowry, in the same manner as in Greece, the bride is presented with so many Olive-trees.

That Dr. Landerer has been greatly deceived by his informant will, I think, be very evident from the subjoined testimonies:

1. Niven Ker Esq., who was for several years British Consul at Rhodes, informed me that he was quite ignorant of the carrying on in that island of the manufacture described by Dr. Landerer.

2. Sidney H. Maltass Esq. of Smyrna in a letter to me under date 7 October, 1853, speaking of *Liquid Storax*, says " Cos and Rhodes produce none."

3. Lieutenant Robert Campbell R.N., H.B.M. Consul at Rhodes, writes from Rhodes under date 16 December, 1855, that Mr. Landerer in attributing to the islands Cos and Rhodes the production of Storax, has committed an egregious error, as they have never produced it.

Moreover, the evidence of Mr. Maltass proves, as I shall shortly show, that *Styrax officinale* is *not* the tree yielding *Liquid Storax.*

There are other exceptional points in Dr. Landerer's account, which I will for the present pass over, remarking only that the statement that liability to the punishment of death is incurred in the case of a person being detected adulterating Storax with turpentine, is characterized by Lieut. Campbell as " a mere invention."

Previous to detailing the information which I have collected as to the method of preparing *Liquid Storax*, it will be well briefly to review the various opinions which have been held as to its origin.

1. Many of the older writers on Materia Medica consider it an artificial compound; Dale in particular, asserts, that what was found in the London shops in his time (1693) was altogether factitious.*

2. Those writers who adopt Dr. Landerer's statement, regard *Liquid Storax* as the produce of *Styrax officinale* Linn.

3. By many authors, *Liquid Storax* is referred to *Liquidambar styraciflua* Linn., a tree found in the southern part of the United States, in Mexico, and in other parts of Central America.

However capable that tree may be of producing an analogous resin, it is well ascertained that the *Liquid Storax* used in England, is all imported from the Levant; and there are sufficient reasons to conclude that such is also the case with that used on the continent and that it is certainly not the produce of America. I therefore dismiss the supposition that the *Liquid Storax* of commerce is of transatlantic origin.

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* " Verum quod in officinis nostris pro Styrace liquido venditur omnino factitia res est, ut certior factus sum à pharmacopolis variis Londinensibus."—*Pharmacologia*, Lond. 1693, p. 427.

By some authors, *Liquid Storax* has been conjectured to be the produce of *idambar altingiana* Blume.

his tree is a native of the islands of the Indian Archipelago and of Burmah, re the inhabitants occasionally extract from it an odoriferous semi-fluid n; but the product is not abundant, nor does it resemble the *Liquid Storax* ommerce; there is not moreover, the slightest evidence of it reaching ope in any quantity.

is however, a curious fact that the name by which this tree is at the nt day known to the Malays, is *Rasamāla*, a word very close to Petiver's *Mallas*. To this I shall revert in a future page.

Liquidambar orientale Miller, is regarded by Guibourt, Lindley, the authors he French *Codex*, and some others, as the source of *Liquid Storax*, an ion which I shall be able to show to be correct.

(*To be continued.*)

ME OBSERVATIONS ON THE COPALS OF WESTERN AFRICA.

BY W. F. DANIELL, M.D., F.L.S.,
Honorary Member of the Pharmaceutical Society.

(*Continued from page* 373.)

II. South Guinea Copals.

se Copals of Southern Africa afford several characteristic features which serve istinguish them from those above described. They appear only to have been overed at the commencement of the present century. They usually occur rger and flatter masses, with a less nodulated or globular superficies, and less compact and solid than the northern varieties. Owing to their brittle-, they break with a clear, vitreous-like fracture, and display a beautiful smooth, hed surface, of great purity and transparency. Their variations in color more numerous than those from northern Guinea. They apparently depend he nature of their exterior crust, since, upon its removal, they exhibit more ess their primitive whiteness. These exudations are thrown out not only the bark, but the roots of trees also, if the reports of negro traders can be ited; for to the eastward of Ambriz and Musula, in the districts where their orations are carried on, no copalliferous trees exist, the resin being dug of the ground. They also assert, that during their labors they sometimes t with vestiges of roots deeply embedded in the soil, from which they detach excretion. Other species are, however, taken from living plants. Old and ially decayed trees yield the largest supply. The season most favourable the collection of these resins, is shortly after the termination of the rains. s group comprises three sub-divisions, viz.:—

Kongo.—These copals include several varieties known in commerce. They generally procured from the coast between Cape Lopez and Musula, from rated regions beyond Loango, Ambrizette, Ambriz, &c. Considerable ex- tations occur from these localities. Prince's and St. Thomas Islands derive ir limited supply from the shores of the adjacent continent, which the nial merchants re-ship for Lisbon. The quality is not so good as in those of e northern growth. In Ambriz two kinds are recognized by the country ors, based partly on distinctions of form and color. According to the ations of the natives, both are excavated from the soil on hilly table-lands, n days' journey to the north-east inland. Their vernacular appellation is *quata*, by the Portuguese residents they are indiscriminately termed *ma Copal*. The country traders bring them to the European factories in s made from the palm leaf, each containing from twenty to thirty-five nds. They receive in exchange cotton fabrics, beads, hardware, powder, , at the rate of 4*d*. or 6*d*. per lb. In 1845-46, not less than 40,000 lbs. were orted from Ambriz and Musula alone. The first kind is found in somewhat round, smooth, or large angular aud broken spheroidal fragments, of a pale yellow or orange hue, with the exterior slightly coated and corrugated by small granulations. Upon clearing away the crust, the resin becomes singularly clear and translucent, and of a white color, hence the designation of white copal bestowed on it by the American traders.

The second or red copal also plentiful in Angola, is produced in broken, flat, and angular or irregularly conchoidal fragments, of a fine red within, and externally variegated by an admixture of orange and ruby colors. Their outer surface is seldom granulated, but in lieu thereof, is enveloped by a rough scabrous incrustation having a crystalline aspect, resulting from a conjunction of various minute asperities and projections. It is frequently mixed with the preceding sort, and may possibly be an exudation from another portion of the same tree, but modified by local agencies. Though deemed inferior to the copals of Sierra Leone, they are, nevertheless, highly appreciated in Europe and America, and fetch from 95*s.* to 110*s.* per cwt.

b. Angola.—This subdivision contains but few varieties; the most common are the red Kongo copal, a yellow-coated sort, and another termed *red Animé.* According to Portuguese authorities, these valuable excretions were only discovered in 1807, principally in the district of Pungo-andongo, situated a few miles north of the Cuanza, and about eight or nine days' travel from St. Paul de Loando. By the Ambundas, or negroes of Angola, they are designated *Mukokoto*, and the trees which produce them *Montongé.* The Portuguese merchants at St. Paul de Loando purchase large quantities, at from 400 to 800 reis per arroba. From the date of their discovery (in 1807), to 1830, the aggregate amount obtained did not exceed 165 arrobas, or 5,280 lbs. In 1825, only 26 arrobas, valued at 26 milreas, were shipped to Lisbon. In 1830-31-32 the total exported was 4,329 @, valued at 8,658 milreas, which exportation had increased, for 1844 alone, to 8,600 @. From the Portuguese dependencies on the coast, not less than 24,342 @, or nearly six quintals, were transmitted to Portugal in 1845, independently of the quantity taken by the English and American vessels. The supply, since that period, has been progressively increasing.*

The red Angola copal, erroneously termed "*red gum Animé,*" is vended in somewhat small spheroidal, or globular fragments about the size of a pigeon's egg, and covered with a smooth or peculiarly granulated and warty coat. The color varies from a deep orange to a rich ruby, which however, partly disappears when the crust is removed. These distinctive characters are of more uniform appearance than others; hence their recognition among various allied resins becomes easy. Their mercantile value is less than the Kongo copals, the price ranging from 85*s.* to 95*s.* per cwt. in the English markets.

c. Benguela.—Our knowledge concerning these copals is very limited. They are chiefly referable to the class known as "*coated copals,*" and evidently approximate in several points to those of the Slave Coast. The difficulty of their purification, with the diminution of substance, and great waste which necessarily ensues from the process, renders them of less importance in a commercial point of view. They are found in irregular, flat or flaky and spheroidal fragments, studded by diversely-shaped elevations, and enclosed by a chalk-like exsiccated crust, readily reduced into powder by friction. Within, the color changes from an opaque white to a pale lemon or greenish yellow, the latter of which usually predominates. They are conveyed from the interior by the natives for a considerable distance, are more exclusively exported by the Portuguese merchants to Lisbon, and are therefore sometimes named Lisbon copals in the English markets. Another source of supply is by their direct exportation in English vessels from the coast, which renders them more accessible to purchasers. Their price fluctuates from 20*s.* to 110*s.* per cwt.

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* *Ensaios sobre a Statistica das Possessões Portuguezas na Africa Occidental,* &c., por J. Jose de Lima, livro iii. ch. iv., page 72, 77, &c.

III. GUINEA ANIMÉ'S.

The Guinea Animé's, or false copals as they are frequently termed, seem to be almost unknown. They are few in number, and have hitherto been mostly limited to South-West Africa. The *Hymenæa Courbaril* Lin., or some nearly related species, however, abounds in the Gambia, but the resin does not appear to be collected for any mercantile use. Several varieties can occasionally be met with among the samples of Kongo and Angola copals, but are not easily detected. In Ambriz, these products have long been identified from other resinous excretions by the appellation of "*Tree gum*;"[*] and the European traders, in accordance with instructions received from the home houses, refused purchasing any quantity. This restriction to a certain extent, became requisite on account of their low value and difficulty of sale, when other and superior resins could be purchased. Notwithstanding their inferiority, they are still occasionally retailed in England under the name of Lisbon copals. The native vendors, fully cognizant of their prohibition, try to effect their sale by mixing them, in small quantities, with the true copals, which stratagem when discovered, was summarily punished by a confiscation of the adulterated stock. They are doubtless, procured from some species of *Hymenæa*, judging from the conjugate leaves and broken legumes, sometimes found in the bags.

Chemical authorities mention two modes by which Animé's can be distinguished from true copals.

1. Animé's soften in the mouth, are not so brittle between the teeth, and do not afford that peculiar grittiness common to ordinary copals. This statement however, is only correct to a certain extent, since copals of recent formation are quite as soft as Animé's, and in other respects can barely be distinguished from them by these tests.

2. The second, and by far the most efficient means of determining their true nature, is by the difference of solubility in various alcoholic fluids. European residents in the Kongo countries usually had recourse to the following process to ascertain the distinction and quality:—a small piece of the resin was placed in a glass tube (about four inches in length), half filled with spirits of turpentine. Heat was gradually applied, until the liquid boiled for several minutes. If the substance consisted of Animé, it was nearly, if not wholly dissolved; whereas, if copal, only a partial solution ensued. The superior class of copals were evidently very slightly acted on, and the recent whitish exudations still less so by this, and other alcoholic menstrua. As an ordinary rule, it was considered that the quality of the copal was augmented in value, in proportion to its resistance to solubility. Their limited solution has been attributed to the existence of a greater proportion of that gelatiniform resin alluded to by Chemists in their analysis of these substances.

Two or three varieties of Animé may be observed in the countries previously enumerated, all probably exudations from the same tree, or some closely allied species. From long practical experience, traders can readily detect their admixture with copals by the eye solely, partly from their peculiarity of color and partly from other physical aspects. Their external surfaces are cleaner, more smooth, and less coated by adventitious deposits. They assume in form more of a globular or nodulated character with a trifling degree of roughness, and have a paler hue than the conjunctive copals. They are produced (1) in moderate-sized globular or spheroidal concretions of pale lemon color; (2) in small semi-opaque oblong and nodulated fragments of a milky whiteness; (3) in clear yellow nodules or conglomerated tears, which resemble much the Akkrah copal.

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[*] The title of *Animé* was probably derived from some vernacular appellation of African origin, under which it was sold to the earlier Portuguese voyagers. Gomara, in his *Cronica de la Nueva Espana*, published in 1553, observes that the Mexicans were (like the Ambriz people) clearly aware of the distinctive characters peculiar to their copals, since they denominated the hard kind *Xolochcopalli*, and the soft *Copalcahuitl*.

This last is the variety which is so frequently sold in the English markets as Lisbon copal. The whole, I have found by experiment, can be dissolved in turpentine and other alcoholic fluids. Although there is every reason to believe that they are the product of of some species of *Hymenæa*, it is a subject for doubt whether any of the ordinary African copals can be traced to the same source.

ON WILD SENNA.

BY DR. CARL MARTIUS.

At the meeting of Apothecaries held at Munich, Dr. Walz exhibited, under the name of *Wild Senna*, some leaves which had come into his possession, and with which none of those present was acquainted.* At the meeting of Naturalists at Vienna, these leaves were also exhibited by Dr. Walz, as *Folia Coluteæ*. More recently I have received the August number of the *Neues Jahrbuch für Pharmacie*, in which, at page 87, a notice on the subject occurs from the pen of the same *savant*. His examination into the origin of these leaves led to no definitive conclusion. The supposition that *Coriaria myrtifolia* might afford them, was disproved by a comparison with that plant as growing in the Botanical Garden at Heidelberg,—although some of their physical characters, such as smell and taste, seemed to favour such an opinion. The question was not that of the *adulteration* of Senna with broken Coriaria leaves, as noticed by Peschier,† but of a substance which of late is brought as *Wild Senna* from France to Germany for a secret technical purpose, *tanning*, as it is supposed, and which by chance might give rise to errors and adulteration.

About this time my father, Dr. Theodor W. C. Martius, obtained a small sample of this *Wild Senna*, which was designated *Folia Coluteæ*. The coriaceous, smooth, dull-green leaves have a peculiar aromatic smell, reminding one of fresh Willow Bark, and an astringent, very bitter taste; they are mixed with mature and immature flowering heads, and with pieces of stick. Broken acorn-shells, single leaves of *Pistacia Lentiscus* L. and of *Rosmarinus Hispanicus* L., occur also as admixtures. The leaves of this *Wild Senna* vary in size and form. The smallest are but a few lines long, and at broadest but 2 lines; the middle-sized are about 6 lines long and from 3 to 4 broad; the largest seldom exceed 10 lines in length by 4 lines in breadth. The leaves are entire; some obovate-lanceolate, some lanceolate, and some lanceolate-cuneate, narrowed at the petiole, and terminated with a point or *mucro*. This *mucro*, a continuation of the mid-rib, is most evident in the lanceolate leaves—least so, and apparently often wanting, in the oval leaves. Together with these three forms, there often occur trident-pointed leaves 6 to 8 lines long, and 2½ to 4 lines broad. The epidermis is firm and thick; the mid-rib visible on both sides (more clearly on the under), and evidently protracted into a point; the lateral veins are three in number, and indistinct. On the surface viewed with a lens numerous white points (*Spaltöffnungen*), which Kosteletzky‡ and others appear to have taken for glands, are perceptible. The phyllaries of the flower-head are delicate, scarious, brown, ovate, standing around the grey, hairy calyx; the stalk is angular and striated, and without axillary glands. This description applies exactly to the leaves of *Globularia Alypum* Linn., whose employment for the adulteration of Senna Leaves, improbable as it appears, has yet frequently occurred, as has been stated by my father in his *Pharmacognosie*, p. 161.

Globularia Alypum Linn. (*Globulaire Turpith, Boulette, Turpith blanc, Senna of Provence*, called by the Spanish *Segulada*, and by the Greeks of Zante [illegible]) belongs to the Linnean class *Tetrandria*, order *Monogynia*, and the natural family *Globulariæ* of De Candolle. It occurs in the region of the Mediterranean as a perennial shrub of from 1 to 2 feet in height. After a comparison with a botanical specimen in the herbarium of Professor Schnitzlein, my honoured tutor, who on this occasion assisted me with his usual kindness, I found that the smaller of the leaves which I have described, were attached to the stalks and short twigs of the lower part of the shrub, while the tridentate larger leaves are those of the flowering shoots.

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* *Augsburger Allgem. Zeit. Beilage*, v. 5, Aug.—*Archiv d. Pharmacie*, October, p. 100.

† *Trommsdorff Journal*, 1828. Bd. 16, p. 57 and 64.

‡ *Allgemeine medizinisch-Pharmaceutische Flora.* Bd. 6, p. 678.

The *Globularia* was known in the middle ages as a purgative, and was, as Geiger states, introduced into medicine under the idea of it being the Ἄλυπον of Dioscorides, a plant whose fruit was anciently used as a purgative. Lobel, Dalechamp, and Bauhin regarded the *Globularia* as so violent a remedy, that they termed it *Frutex terribilis*. Clusius figures it in his *Historia* under the name *Hippoglossum Valentinum*, and states besides, that in Spain it is called *Coronilla de Frayles*, i. e. *Coronula fratrum sive monachorum*. Clusius, Garidel, and especially later writers, as Nissole (1712) and Ramel (1784) have endeavoured to prove its harmlessness as a simple purgative, and Ramel has even lauded it as a febrifuge: nevertheless, both De Candolle and Gilibert (1806) pronounce it a violent drastic. Loiseleur-Deslongchamps, however, after a trial of the leaves upon twenty-four patients, came to the conclusion that the remedy was a mild evacuant, preferable even to Senna, since it had not the repulsive smell and taste of that drug; it acted less violently, and less frequently occasioned griping. The doses given were from 48 to 100 grains in decoction.

In the *Dictionnaire Universel de Matière Médicale* of Mérat and De Lens,* *Coronilla Emerus* L. is given as the origin of *Sené Sauvage*, as well as of the leaves known as *Sené Bâtard*, or *Faux Baguenaudier*. That the leaves which I received were neither those of *Coronilla* nor of *Colutea*, it is needless further to insist upon. It shows, however, that there are two kinds of *Sené Sauvage*, or *Wild Senna*, viz., the leaves of *Coronilla Emerus* L., known in France, and those of *Globularia Alypum*, occurring in Germany. Whether our drug, which there is reason to think may be from the same source as that of Dr. Walz, is really identical with his, will soon be determined.

A chemical examination, I regret to say, could be but very superficially performed, owing to my time being previously engaged with other chemical researches. The brown decoction, however, had a strong acid reaction, and not disagreeable odour of Willow Bark, and an intensely bitter quinine-like taste. Solution of baryta and acetate of lead precipitated a yellowish colouring matter, which appeared of the same nature as that found in Rhubarb and in *Rhamnus Frangula*. The decoction also contained gallic and tannic acids, besides some indifferent extractive matter.

It was remarkable, that after two extractions with water, the leaves became completely black. In conclusion, I may express the hope that Dr. Walz may, by a chemical analysis and the isolation of the crystallizable bitter substance which he has discovered, succeed in completing our acquaintance with this so-called *Wild Senna*.

AMYLENE;

A NEW ANÆSTHETIC AGENT.

DR. SNOW, in a paper read before the Medical Society of London, on the 10th of January, and since published in the *Medical Times and Gazette*, has directed attention to amylene as an anæsthetic agent, and numerous trials of this substance for producing insensibility are now being made. In the paper alluded to Dr. Snow briefly traces the history of the introduction of anæsthetics. He gives the following quotation from Sir Humphrey Davy's *Researches concerning Nitrous Oxide*, published in the first year of this century: "As nitrous oxide in its extensive operation seems capable of destroying physical pain, it may probably be used with advantage during surgical operations in which no great effusion of blood takes place." About forty years after the publication of this sentence nitrous oxide was used with doubtful success by Mr. Wells, a dentist, of Hartford, Connecticut, in some cases tooth extraction; but its use was speedily relinquished, the effect being considered uncertain. In September, 1846, Dr. Morton, who had previously been in partnership with Mr. Wells, and had witnessed the trials with nitrous oxide, administered the vapour of sulphuric ether with success in a case of tooth drawing, and afterwards in surgical operations. This led to the general use of ether vapour. In 1847 Mr. Jacob Bell substituted the substance known as chloric ether for sulphuric ether, and this, although not sufficiently active, was found to produce insensibility. In the autumn of 1847 Mr. Waldie, of Liverpool, being in Edinburgh, explained to Dr. Simpson that the so-called chloric ether was a solution of chloroform in spirit, whereupon the latter obtained some pure chloroform and administered it with great success. Dr. Snow states, "Ever since the introduction of chloroform I have been of opinion that other agents would be met with more eligible for causing anæsthesia by inhalation. It seemed improbable that this one, which happened to be standing on the shelf of the Pharmaceutical Chemist for another purpose, should be better than all the very numerous volatile compounds which organic chemistry is daily bringing to light; and the continued use of chloroform is probably due to the circumstance, that hardly any one has made anæsthesia by inhalation a subject of constant and protracted investigation. I have from time to time made experiments on animals with a variety of substances, and I find that the agents which might be inhaled for the prevention of pain, in the absence of others which are more eligible, are extremely numerous. They include, among other things, carbonic acid and carbonic oxide gases, olefiant gas, the vapour of hydrocyanic acid, and cyanogen gas; which last is contained, as I found, in the fumes of the puff-ball, which Dr. Richardson brought before the notice of this Society. The agents which I have exhibited as anæsthetics to the human subject, in addition to ether and chloroform, have as yet been but few. They are nitric ether, Dutch liquid, benzin or benzole, a bichloride of carbon, made by decomposing chloroform with chlorine gas, the monochlorinetted chloride of ethyle, and amylene, the subject of this paper. Nitric ether was exhibited also by Dr. Simpson, and Dutch liquid by him and Dr. Nunneley. These substances possess no advantage over chloroform, unless it be in their slower action, while in other respects they are scarcely so agreeable. With regard to benzin, I discontinued the use of it on account of convulsive tremors which it occasioned in a case of amputation in St. George's Hospital. I found that these tremors are a constant result when its effects reach a certain stage. I administered the chlorinetted muriatic ether in twenty surgical operations in the summer of 1851, chiefly in King's College Hospital. Its sensible and physical properties and its effects, are nearly the same as those of chloroform, but I thought that it might possess some advantage in the circumstance that, being less volatile, while its other properties are the same, it would be less liable to cause accident, even if incautiously used. I was, however, prevented from using it further, owing to the great difficulty of procuring it in a state of purity." He further states : "I was not aware of the existence of amylene till a few months ago, or I should have tried it sooner; for I made inquiry in 1848 for a substance named eupion, by Reichenbach, its discoverer, but was unable to obtain it. Eupion is a carbo-hydrogen, described as having all the physical characters which belong to amylene, though obtained in a different way, and I believe it is the same substance. Reichenbach obtained it from coal-tar, but other chemists have not been able to make it."

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* Tome vi., p. 467.

Dr. Snow describes several cases in which he has administered amylene, and says: "The relative advantages and disadvantages of amylene may, as nearly as I can judge, be summed up as follows :—In regard to its odour, it is more objectionable than chloroform, but much less so than sulphuric ether. The odour of any volatile substance is, however, no longer perceived after a patient begins to inhale. In respect to its pungency, it has a great advantage over both ether and chloroform, being much less pungent than either of them. Thus, whilst the patient, especially if a female, often complains of a choking feeling and want of breath, in commencing to inhale chloroform, and two or three minutes are lost before the vapour can be inhaled in any useful quantity, she can begin to inhale the amylene of full strength within half a minute from commencing, and the operation may generally be begun within three minutes. In the amount which suffices to produce insensibility, it is intermediate between chloroform and ether, chloroform having the advantage. Amylene has an advantage, in preventing pain with a less profound stupor than that occasioned by the other agents, and in the ready waking and recovery of the patient it has an advantage over chloroform, and a still greater advantage over ether. Its probable safety I have spoken of;* and the greatest advantage of all, if it should continue to be met with in all cases, is the absence of sickness from its use. The almost entire absence of struggling and rigidity may also be mentioned as an advantage of amylene over ether and chloroform."

Preparation and Properties of Amylene.—Amylene was discovered and described in 1844 by M. Balard, of Paris. It is made by distilling fusel oil, or amylic alcohol (the oily liquid which is separated from spirit of wine in the process of rectification), with chloride of zinc. On adding the fusel oil to a concentrated solution of chloride of zinc while they are cold, solution or admixture does not take place, but on applying heat they mix and form a homogeneous liquid, which begins to distil at a temperature of about 266° Fah. On re-distilling the product thus obtained, the ebullition which commences at 140° Fah., rises during the process to about 570° Fah. The most volatile parts of this distillation are to be separated, and agitated with concentrated sulphuric acid, when the amylene in a pure state will rise to the surface. It is colourless, very mobile, and has a low specific gravity (stated by Dr. Snow to be 0.659 at 56° Fah.). Its boiling point is 102° Fah., and the density of its vapour is 2.45. It has a peculiar and disagreeable smell. Its composition is represented by the formula $C_{10}H_{10}$. It is soluble in alcohol and ether in all proportions, but is very sparingly soluble in water. Specimens prepared by different manufacturers have been found to present some difference in their sensible characters, which probably arises from the circumstances that the fusel oil from which it is made is not a definite body of uniform composition, and that the amylic alcohol, the principal constituent of the crude fusel oil, is not easily isolated in a state of purity. Should it be found that amylene cannot be always obtained in an uniform state, this will be a serious obstacle to its successful employment as an anæsthetic agent.

REPORT OF THE
RESULTS OF PHYSICAL AND CHEMICAL INVESTIGATION
AND OF THE
APPLICATIONS OF PHYSICS AND CHEMISTRY IN THE ARTS.

BY B. H. PAUL, Ph.D., F.C.S.

(*Continued from page* 379.)

Production of Stearine and Oleine.—Mr. Hills has obtained a patent† for improvements in the production of these substances. His method consists in mixing the fat, heated to 110° F., with 10 per cent. dry sulphate of lime, chloride of calcium, or other suitable substance capable of absorbing water; then adding 5 per cent. hydrochloric or nitric acid, and stirring the whole together for an hour; water is then added, and heated, by means of steam, to the boiling point, until the acid is entirely separated from the fat, when it is run off and melted to separate water, and pressed to separate oleine.

A stream of hydrochloric acid gas or nitric acid vapour may be used instead of the liquid acids and sulphate of lime or chloride of calcium.

Separation of Fat from Soap-Suds, &c.—Mr. Schœffer has obtained a patent‡ for the separation of fat from soap-suds and wash waters, by means of a mixture of clay or aluminous earth and sulphuric acid, heated to 212° F.

Estimation of Acids in Coloured Liquids.—To obviate the difficulties attending the volumetrical estimation of acids in coloured liquids, Dr. A. Müller§ proposes mixing with the liquid, before the addition of the alkali, some chloride of ammonium solution, and making the experiment in a flask, fitted with a funnel tube, through which the alkaline solution is added, and a bent discharge tube containing a slip of litmus paper, which indicates the point of neutralization by becoming blue in consequence of the generation of ammonia from the chloride. The result thus obtained is stated to be sufficiently accurate for ordinary purposes, but if greater precision is required, the excess of alkaline solution requisite to cause the coloration of the litmus by the decomposition of chloride of ammonium in an equally dilute solution, may be ascertained by direct experiment, and a corresponding correction applied.

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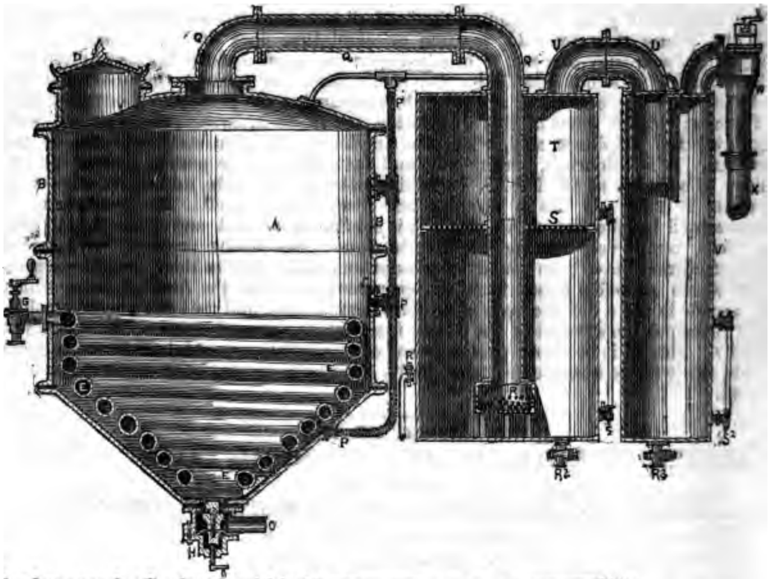
* The author states, "While I cannot venture to predict for it the absolute safety which seems to attend sulphuric ether under all circumstances, I confidently trust that it will be perfectly safe with careful management."

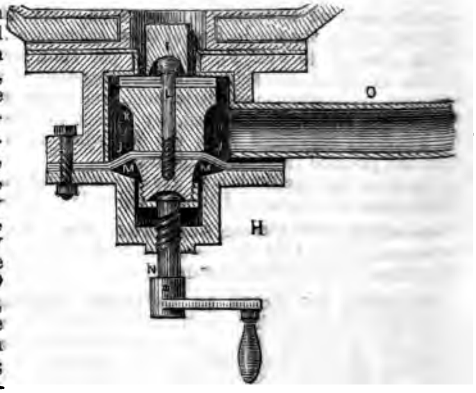
† Specification, No. 654, 1856.

‡ Specification, No. 667, 1856.

§ *Polytechnisches Centralblatt*, 1856, p. 578.

Production of Tartaric and Citric Acids, &c.—Mr. Pontifex has obtained a patent* for improvements in the production of these acids and their alkaline salts. His method consists in evaporating in vacuo. The apparatus used consists of a leaden vessel, *C*, placed within a cast iron case, *B*, furnished with a man-hole, *D*, a leaden worm, *E*, for the steam, a valve, *G*, for admitting steam to the worm, and a valve, *H*, for discharging the contents of the pan. This valve consists of a spindle, *L*, carrying the lead piece, *K*, which is covered with caoutchouc, *I*, and a caoutchouc disc, *J*, a nut and washer, *M*, a screw spindle, *N*, fitted with a handle by which the valve is worked; *O* is a pipe leading from the valve, *H*; *PP* pipes for exhausting the air from between the cast-iron case, *B*, and the lead vessel; *Q*, is the passage to the overflow receiver, which contains chalk, milk of lime, or other carbonated or alkaline solution at the bottom, and through which the vapour from the vacuum pan is conducted by the pipe *Q*, terminating in the rose *R*; R^1 is a supply-cock and pipe; R^2 and R^3 draw-off-cocks; *S*, the perforated priming-plate; S^1 and S^2 the glass gauges. The upper portion, *T*, of the overflow vessel may be called a safety vessel, and is connected by the passage, *U*, with a second safety vessel, *V*; the valve *W* is for cutting off communication between the pan, &c., and the condenser, and *X* is the pipe leading to the condenser and air-pump.





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* Specification, No. 598, 1856.

Estimation of Phosphoric Acid.—Dr. Knop* has instituted a series of experiments on the applicability of a method of separating and estimating phosphoric acid, which is based upon the facts that phosphate of uranium and ammonia [$2(Ur_2O_3)\, NH_4O, PO_5$] is insoluble in acetic acid, and is always precipitated when acetate of uranium solution is mixed with solution containing phosphoric acid, with a considerable amount of ammoniacal salts and free acetic acid. The insoluble phosphates are decomposed by boiling with acetate of uranium in the presence of ammoniacal salts and free acetic acid, the phosphoric acid being entirely converted into phosphate of uranium and ammonia, while the bases with which it was combined are dissolved as acetates. By ignition the double salt is converted into phosphate of uranium [$2\, Ur_2O_3, PO_5$].

For the separation of phosphoric acid from bases by this method, the substance, which must be free from organic admixture, is dissolved by hydrochloric or nitric acid, the solution evaporated to a small bulk, saturated with ammonia, mixed with a considerable quantity of acetate of ammonia, and acetic acid added in large excess.

When the solution contains only alkalies, lime, baryta, or magnesia, it remains clear, but when iron or aluminium are present, there is a precipitate of phosphate. In either case the liquid is mixed with acetate of uranium solution, and boiled for some time.

The separation of the precipitate is attended with some difficulty, especially in presence of acetate of potash and certain other salts. It may be effected best by evaporating to dryness on a steam-bath, then covering the residue with strong acetic acid, digesting for a while, and, after adding water, heating nearly to the boiling-point. When the solution contains a large amount of iron, the phosphate of uranium and ammonia is precipitated as a dense powder, which may be separated by filtration without any difficulty; but it contains some phosphate of iron, and therefore does not admit of the phosphoric acid being estimated directly.

In burning the filter, especial care must be taken to guard against reduction of the oxide of uranium and phosphoric acid, and after ignition, the precipitate should be moistened with nitric acid, dried, and again heated to redness before being weighed.

Preparation of Matches.—Prof. Wagner recently had occasion to inquire into the preparation of matches, and gives the following results of his observations:†—

The ingredients used are phosphorus, a metallic oxide, nitre, and a cementing substance.

One of the most important points in the preparation of the paste is the proportion of phosphorus. This should not be more than $\frac{1}{10}$ or $\frac{1}{12}$ when the phosphorus is melted in solution of gelatine after the usual method.

A much smaller amount of phosphorus is sufficient for the preparation of a good paste when the mode of preparation is altered. A greater effect is produced with a given quantity of phosphorus when it is very finely divided, on account of its greater inflammability in this state. A solution of phosphorus in bisulphide of carbon leaves the phosphorus so finely divided on evaporation, that it ignites by contact with the air. However, when this finely divided phosphorus is mixed with solution of gelatine, the dry mass does not ignite when exposed to the air, although it is very inflammable.

Apart from the greater expense of a large amount of phosphorus, it is otherwise disadvantageous, owing to the production of a film of phosphoric acid, which renders the ignition of the wood or stearine more difficult.

Professor Wagner recommends the following mode of preparation:—

8 parts phosphorus dissolved in bisulphide of carbon.
21 " gelatine.
24 " peroxide of lead.
24 " nitre.

He considers that the binoxide of manganese would be the best adapted to the preparation of the paste, since it contains a larger amount of oxygen than red lead or peroxide of lead, and as the metallic oxide serves only to maintain the combustion by yielding oxygen.

The nitre also is supposed to be serviceable only as a source of oxygen, and might therefore be replaced by some other nitrate, for instance, nitrate of baryta, which, like the potash salt, is anhydrous.

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* *Chemisches Centralblatt*, 1856, No. 49.

† *Jahresbericht über die Fortschritte der technischen Chemie für* 1855.

The amorphous phosphorus does not seem to be nearly so good for the preparation of matches as ordinary phosphorus, most likely in consequence of the necessity for the conversion of amorphous phosphorus into ordinary phosphorus before ignition takes place.

Volumetric Analysis.—Dr. Mohr[*] shows that his method of estimating chlorine by means of a silver solution, together with chromate of potash, is capable of very general application. The substance to be estimated is converted into chloride, the amount of chlorine estimated, and that of the substance sought calculated in the usual way.

Ammonia is estimated by mixing the solution with hydrochloric acid, evaporating to dryness, and the chlorine in the residue estimated with silver solution.

Nitrogen is estimated in a similar manner, after conversion into ammonia by means of soda lime.

Carbonic acid is absorbed in a mixture of chloride of barium and ammonia, the carbonate of baryta collected upon a filter, washed, dissolved in hydrochloric acid, the solution evaporated to dryness, and the chlorine estimated.

Carbonates and *nitrates* are converted into chlorides, the chlorine estimated, and the equivalent of carbonate or nitrate calculated.

Salts of organic acids are converted into carbonates by ignition, then into chlorides.

Chlorates, iodates, bromates, are converted into chlorides, iodides, and bromides by ignition.

The above instances will show that there are many cases in which this mode of indirect estimation may be adopted with advantage.

Action of the Oxides of Nitrogen upon Iodide of Potassium and Starch.—M. Bechamp states[†] that—

1. The ozonometric paper is not rendered blue by pure dilute nitric acid, but that it is coloured by acid containing nitrous acid.
2. Nitric acid and hydriodic acid do not react in a cold solution.
3. Iodide of potassium reduces nitrous acid to nitric oxide.
4. Carbonic acid does not displace nitrous acid from nitrite of potash.
5. Nitrous oxide and nitric oxide do not liberate iodine from iodide of potassium.

METEOROLOGICAL REPORT

From St. Mary's Hospital, Paddington, for the Year 1856.

BY MR. COPNEY.

INTRODUCTORY REMARKS.

In almost every age much thought and observation have been expended in the contemplation of those varied elements, the study of which is the object of meteorology. There never was a time, however, when all that pertains to climate and weather, and their influence upon animal and vegetable life, received such an amount of systematic and practical attention as at the present. The term itself—meteorology, is of wide import, and requires some qualification. For the purposes here contemplated, climatology, or climatal-meteorology, would, perhaps, be more eligible.

In the present state of knowledge, meteorology deals principally with the past; we may be cognizant of what the weather has been—facts have been recorded, but our acquaintance with these has hitherto done but little in enabling us to prognosticate their recurrence with accuracy and certainty. Those who are in the habit of observing and registering the state of the atmosphere, in accumulating from day to day the records of the variations in its pressure, temperature, &c., are sometimes called upon, and not unnaturally, to afford information as to what the weather is "likely to be." It must be confessed, that when put to this practical test, the knowledge already acquired would seem to be of small value. We may know the precise temperature, &c., of to-day, but what will it be to-morrow? The barometer may be high, the sky clear, the air calm; but before the morrow's sun, all *may* change, and we are thrown back, in part at least, upon probabilities—upon those empirical indications, which have served mankind for ages in their attempts to "discern the face of the sky." It is not intended to aver, however, that the records already accumulated do not admit of some application for the purpose referred to, but we can scarcely afford to dispense with such other aids as may present themselves. Whether the mercurial column be rising or falling, and whether rapidly or slowly; how near the temperature to the average of the year or the part of the year; whether the difference between the dry and wet bulb thermometers be great or small; in what direction the wind may be blowing;—are some of the aids which these observations supply, and by means of which, taken conjointly with the aspect of the sky, or with any of the usually received forerunners of the weather, it is frequently possible to predict, with some approach to the truth, its probable condition on the morrow. The existence, even in the nineteenth century, of such an oracle as "Old Moore," is not very surprising, when that which is called science gives an "uncertain sound." For the purposes of life, men require specific information, and in its absence, they will have recourse to the calendar of the empiric, rather than be without any.

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[*] *Annalen der Chemie und Pharmacie*, xcix., 197.

[†] *Comptes Rendus*, xliii., 388.

There is required increased knowledge, and a more distinct acquaintance with the precise relationship and influence of the various elements, which are already known to cause *in some way* the meteorological phenomena which daily present themselves. "The complicated nature of these disturbing causes increases the difficulty of giving a full explanation of meteorological phenomena, and likewise limits or wholly precludes the possibility of that predetermination of atmospheric changes, which would be so important for horticulture, agriculture, and navigation, no less than for the comfort and enjoyment of life. Those who place the value of meteorology in this problematic species of prediction, rather than in the knowledge of the phenomena themselves, are firmly convinced that this branch of science has not made any very considerable progress for centuries past. The confidence which they refuse to the physicist they yield to changes of the moon, and to certain days marked in the calendar by the superstition of a by-gone age."*

The knowledge which we do possess of the climate of our own or of any other country, or of any particular part of the same, is derived from the *averages* or *means* of past observations—words themselves expressive of at least minor variations; and, in relation to our health and comfort, it is these variations which most concern us. In these islands, even the variations themselves are variable, as is found when a given period is compared with a corresponding one, and they constitute in fact almost the only persistent feature of our climate;

"For hot, cold, moist, and dry, four champions fierce,
Strive here for mastery ————————"

Notwithstanding the difficulties and obstacles which present themselves, it is clearly desirable to determine, as nearly as possible, the general characters of climate, and to endeavour to deduce from the facts which have and may be accumulated, the laws by which it is regulated. The more complete our knowledge of the atmosphere which surrounds us—the more distinct our acquaintance with that which is natural and uncontrollable, the more likely are we to become informed of that which is abnormal, and entirely of our own creation.

There are few branches of natural science with which it does not connect itself, and the student of nature will find it difficult to avoid giving some attention, if not to meteorology as a whole, to many of the elements with which it deals. Closely allied to, if it do not form a part of astronomy—of the utmost importance in navigation—running frequently side by side with chemistry—intimately connected with botany, showing itself in the circumscribed habitats of genera and species, and the modifications which it imposes upon their development,—the modifying influence of elevations and depressions of the earth's surface and of large tracts of water, together with the nature of the strata forming the external crust of the earth, connect it with geography and geology—and, as we are constantly breathing such an atmosphere as may surround us, subject to all its alternations of density or lightness, cold or heat, dryness or humidity, its negative or positive electricity, the altered condition of one of its elements in the form of ozone, and all other changes produced in it by less known and by obscure causes; it is undoubtedly very closely connected with our bodily health, disease, and comfort, and thus associates itself with physiology, pathology, and medicine; lastly (it may be here added), inasmuch as the principles and the construction of the instruments employed—the composition of the atmosphere and the general laws of gases—the nature and properties of heat, light, and electricity—the evaporation of fluids—the capillary action of tubular and other surfaces—the geographical distribution of plants; are all taught in the ordinary curriculum of the pharmaceutical student of the present day, the subject is singularly pertinent to and compatible with the pursuits of Pharmacy.

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* Humboldt: *Cosmos.*

It is therefore replete with interest. But what of its practical applications? It may be urged that, however perfect our knowledge of meteorological occurrences, we cannot alter them. The answer is an easy one. Having determined the peculiar meteorological features of a district, and compared them with its ascertained sanitary condition, it is necessary to distinguish them from those causes of disease or mortality which arise from the violation or neglect of the laws of health. Although the winds no more than the waves will obey us, it is our privilege and duty to make such arrangements in the circumstances of our lives as shall secure to the full the benefits of a climate uncorrupted by the miasmata of deadly elements—the result of our own mismanagement. The terrible being, in whatever shape he may present himself, who

> "———————— from his horrid hair
> Shakes pestilence ————————"

is undoubtedly a creature of human production, begot in filth and matured by the elements which arise from it.

"What we want," says the Registrar-General,* "must be distinctly understood: we want pure air and pure water about our dwellings, and the refuse which infects the air, and makes man poison man, to be restored directly to the soil."

IMPORTANCE OF PROPER INSTRUMENTS AND OF ACCURATE REGISTRATION.

It is clearly of the very first practical importance, wherever and by whomsoever observations of this kind are made, that the instruments employed should be trustworthy; that their readings should coincide, under similar circumstances, with those of recognized accuracy, or, what is very nearly the same, that their differences, as compared with the latter, be first determined; and, secondly, that all observers should read alike. In respect to the latter it may be observed that it has been found that two persons reading at the same instant, do not always announce precisely the same figures, a difference of one or two-tenths of a degree being sometimes found between them. The graduation of a degree of the thermometrical scale into ten equal parts is, however, to the practised eye, the result of a momentary inspection; and it is of importance that it be so, since the proximity of the person of the observer very speedily causes an alteration of the indication. It is also necessary that the time or times at which the observations are made, be conscientiously adhered to.

NATURE AND NECESSITY OF THE CORRECTIONS.

To determine the true mean value of any of the elements of observation, so that it shall represent the average of a day, week, or month, several corrections are necessary. The first is for *index error*, and applies both to the barometer and the thermometer. The amount of this correction is supplied by the maker, who furnishes a certificate of the comparison of the readings of the instrument with one of acknowledged accuracy, and it is necessary to apply it to all readings whatsoever. The readings of these two instruments are to be corrected also for *diurnal range*, so as to produce a value from one or two daily observations, which shall equal that obtained by hourly observations throughout the day. The barometer requires to be further corrected for *capillarity*, the amount of which varies with the diameter of the tube, and is dependent also upon whether the mercury has been boiled in it or not; and for *temperature*, so as to bring the reading to what it would have been had the temperature at the time been exactly 32°0 F.; and, lastly, for *altitude*, so as to exhibit the true height of the barometer at the mean level of the sea.

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* Quarterly Report, Sept. 30, 1856.

GEOGRAPHICAL POSITION OF THE STATION.

Latitude, 51° 31′ 0″.24 N.; Longitude, 0° 10′ 19″.12 W.

ENUMERATION AND BRIEF DESCRIPTION OF THE INSTRUMENTS EMPLOYED IN THE OBSERVATIONS.

1. A barometer, made by Barrow, provided with a thermometer to show the temperature of the mercury. The diameter of the tube is 0.32 inch, and the correction for capillarity + 0.013. Its index error is + 0.020, determined by Mr. Glaisher.

2. A thermometer indicating the temperature of the air in the shade (dry bulb thermometer).

3. A thermometer, having its bulb wetted, indicating the temperature of evaporation (wet bulb thermometer).

4. A spirit thermometer, within which is placed an index, which recedes as the temperature falls, but retains its position as the temperature increases, indicating the lowest temperature by night (minimum thermometer).

5. A mercurial thermometer, the tube adjoining the bulb being bent so as to prevent the return of the mercurial column as the temperature falls, indicating the highest temperature by day in the shade (maximum thermometer). These four thermometers are placed four feet above the ground in the open air, and are protected from radiation and rain. The two former are placed vertically, the two latter horizontally.

6. A mercurial thermometer, having its bulb blackened and the tube bent like the one in the shade, placed horizontally one foot above the ground, indicating the highest temperature in the rays of the sun (solar radiation).

7. A spirit thermometer provided with an index, placed upon the ground or grass indicating the lowest temperature by night at the surface (terrestrial radiation).

The whole of these thermometers were made by Negretti and Zambra; and having been tested by Mr. Glaisher to determine their index errors, are perfectly reliable.

8. Glaisher's rain gauge, placed upon the ground.

9. A wind vane, furnished with a dial-plate.

10. Ozone test-papers (Moffatt's and Schönbein's).

Times of Observation, 9h. a.m. and 3h. p.m. daily.

ATMOSPHERIC PRESSURE.

(*Readings of Barometer corrected for Index Error, Capillarity, and Diurnal Range, and Reduced to the constant temperature of* 32°.0 F.)

Height of the Cistern of the Barometer above mean sea level, 125.10 feet.

	Mean Reading.	Highest Reading.	Lowest Reading.	Range.
	in.	in.	in.	in.
January	29.517	30.597	28.892	1.705
February	29.948	30.447	29.625	.822
March	30.064	30.559	29.701	.858
April...........	29.656	30.208	29.091	1.117
May	29.699	30.078	29.275	.803
June	29.928	30.216	29.442	.774
July	29.875	30.176	29.255	.921
August*	29.769?	30.123?	29.151?	.972?
September ..	29.699	30.211	28.648	1.563
October.........	30.053	30.429	29.307	1.122
November......	29.956	30.523	29.279	1.244
December......	29.697	30.509	28.790	1.719
1856.	29.822	30.597	28.648	1.949

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* The observations for August are more or less imperfect, in consequence of an unavoidable change of observers. In the case of the barometer they have been retained, but many of the thermometrical readings have been rejected altogether, inasmuch as their retention would have amounted to an interpolation.

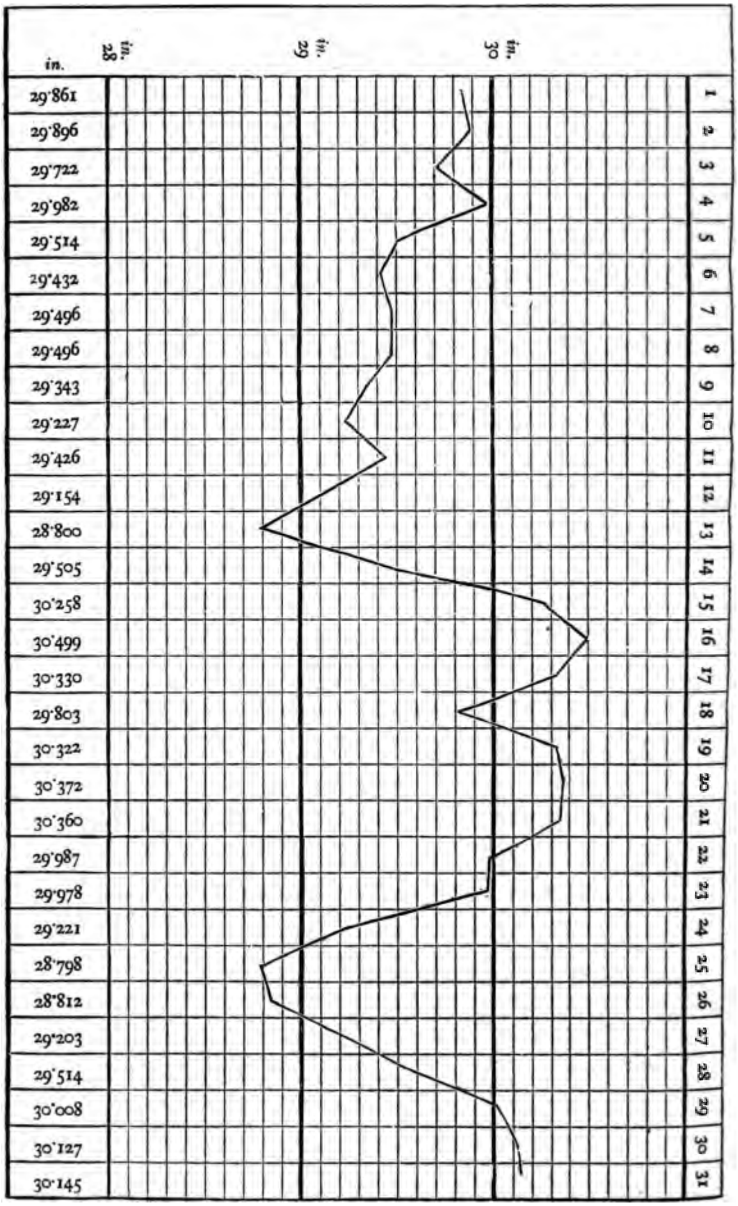

DIAGRAM representing the Fluctuations in the Height of the Barometer during the month of DECEMBER.—Mean Reading, 29.697 in.

The mean reading of the barometer (29.822 in.) is inclusive of the elastic force of aqueous vapour. If the increase in the height of the mercurial column, occasioned by this element (*i.e.*, 0.316 in.), be subtracted, the mean pressure of dry air becomes 29.506 inches. The correction for altitude is +.141; when this is applied, the mean pressure of dry air at the level of the sea becomes 29.647 inches, or, with its vapour, 29.963 inches.

The highest reading during the year occurred on the 13th January=30.597 in.

The lowest on the 28th of September=28.648 in.

(It is remarkable that the highest reading (30.513 in.) in the preceding year, occurred on the 12th of January.)

The highest monthly mean was that of March; the lowest, January.

(The same occurred in 1854; but in 1855, the highest was during January, the lowest during October.)

The fluctuations of the barometer were the most remarkable in the months of January and December. Those of the latter month are represented in the diagram at p. 436.

Comparison with the two preceding Years.

	Mean Reading of Barometer.	Mean of Max. Readings.	Mean of Min. Readings.	Extreme Range.
	in.	in.	in.	in.
1854............	29.885	30.376	29.270	1.883
1855............	29.813	30.250	29.238	1.708
Mean	29.849	30.309	29.254	1.796
1856............	29.822	30.340	29.205	1.949
Difference	—0.027	+0.031	—0.049	+0.153

WEEKLY TABLE OF MEAN ATMOSPHERIC PRESSURE.

(*Readings corrected and reduced.*)

Week ending	in.	Week ending	in.	Week ending	in.	Week ending	in.
January 5	29.737	April 5	29.792	July 5	30.063	Oct. 4	29.469
12	29.395	12	29.309	12	29.715	11	29.972
19	29.807	19	29.905	19	29.893	18	29.983
26	29.137	26	29.841	26	29.784	25	30.256
Feb. 2	29.825	May 3	29.616	August 2	30.021?	Nov. 1	30.204
9	29.888	10	29.844	9	29.907?	8	30.285
16	29.732	17	29.542	16	29.654?	15	29.710
23	29.840	24	29.623	23	29.574?	22	30.067
March 1	30.405	31	29.745	30	29.836	29	29.729
8	30.313	June 7	29.959	Sept. 6	29.900	Dec. 6	29.731
15	30.017	14	29.886	13	29.889	13	29.276
22	29.870	21	29.785	20	29.952	20	30.155
29	29.944	28	30.045	27	29.307	27	29.480

(*To be continued.*)

OBITUARY.

DR. ANDREW URE, F.R.S., &c. &c.,

Honorary Member of the Pharmaceutical Society.

Among the scientific men who gave their countenance and encouragement to the Pharmaceutical Society at its establishment in 1841, the name of Dr. Ure is gratefully remembered. At that time the business of a Chemist and Druggist was only recognized as a respectable trade, and the endeavour to invest it with anything like a professional character by the establishment of a regular Pharmaceutical qualification, was considered by most persons a chimerical project. At that critical period, the sanction and presence, at the meetings, of men enjoying a high position in chemistry and the kindred sciences, had a very encouraging influence on the prospects of the new Society.

Several of the "friends in need" who in considerable numbers thus came forward as its promoters, have passed away, and have been noticed with regret in our Obituary. We have now to offer a similar tribute to Dr. Ure, to whom we are indebted not only for his frequent attendance at our early meetings, but for interesting lectures delivered to the members, and papers which have appeared in the *Transactions* of the Society. Among the contributions to which we refer, the following may be mentioned:

Vol. II., 1842-3.	On Potato Sugar. Analyses of Soda Water and other Aërated Waters. Researches on Pyroligneous Acid.
" III., 1844.	On Alkalimetry, Acidimetry, and Chlorometry.
" IV., 1844-5.	Analysis of Guano. Lecture on the Detection of Metallic Poisons. Lecture on the Analysis of Soils.
" V., 1845-6.	On the Failure of the Potato Crop. On the Potato Disease.
" VI., 1846.	On Paratonneres, or Thunder Rods. On Vegetable Wax.
" VII., 1847.	On Acetic Acid. On the Ebullition Alcoholmeter. The Manufacture of Gas. On the Petroleum of Derbyshire. On the Vinegars of Commerce and their Analyses.
" VIII., 1848-9.	Analysis of the Mineral Spring of Tenbury. On the Deacidification of Wines. On Naphtha. On Naphtha and its uses. Observations on Jennings's Saccharometer.

Dr. Ure was born in Glasgow, in 1778, and was a student in the university of that city. He subsequently studied in Edinburgh, and took his degree of Doctor of Medicine in Glasgow, in 1801, having previously taken that of Master of Arts. In 1804 he was appointed Andersonian Professor of Chemistry and Physics, in Glasgow, where he also delivered regular courses of lectures on Materia Medica. In 1809, when the Glasgow Observatory was about to be established, he came to London, being commissioned to make the scientific arrangements, and he thus became acquainted with the leading Chemists and philosophers of that period. He resided for several years at the Glasgow Observatory. In 1818 a paper by him was read before the Royal Society, which was published in the *Transactions* for that year: "New experimental researches on some of the leading doctrines of caloric, particularly on the relation between the elasticity, temperature, and latent heat of different vapours, and on thermometric admeasurement and capacity." The conclusions of this paper were adopted by Mr. Ivory, Mr. Daniell, and other philosophers, as the bases of their meteorological theories. A paper "On Sulphuric Acid, and the law of progression followed in its densities at different degrees of dilution," in the Journal of the Royal Institution, 1817, was remarkable as an example of the useful application of logarithms to chemistry. A physico-geometrical paper on Mean Specific Gravity appeared in the Journal the same year, and in the next year Experiments to determine the constitution of liquid nitric acid, and the law of progression of its density at various degrees of dilution. Dr. Ure's tables of these acids have been since generally adopted by Chemists. In a paper on Saline Crystallization, the relation of voltaic electricity to that phenomenon was investigated for the first time. A paper in the *Philosophical Transactions*, May, 1822, "On the Ultimate Analysis of Vegetable and Animal Substances," contains some of the earliest accurate researches in organic chemistry. In a paper on Muriatic Acid and Chlorine, in the *Edinburgh Philosophical Transactions* for 1818, Dr. Ure described the eudiometer which bears his name. These are but a few of the subjects in every department of chemical research, treated in a succession of papers that appeared in the various scientific journals. Among these were valuable Reports of foreign science, containing methodical digests of foreign discovery, including comments and comparisons with British science. In 1821 the "Dictionary of Chemistry" was first published, of which many editions have since appeared. In 1824 he published a translation of "Berthollet on Dyeing and Bleaching," in two octavo volumes; and in 1829 a new system of Geology. In 1830, Dr. Ure came to reside in London, and was appointed, in 1834, chemist to the Board of Customs. In 1835 he published "The Philosophy of Manufactures;" and in 1836, a work on "the Cotton Manufacture of Great Britain compared with that of other Countries." Mr. William Fairbairn, of Manchester, has stated that any person might easily make all the machines required for the cotton manufactures by the perusal of Dr. Ure's book,—a sufficient proof of the fulness and accuracy of the descriptions and illustrations.

The *Dictionary of Arts, Manufactures, and Mines* was first published in 1837, with a supplement two years later; the whole having been repeatedly revised to include the most recent discoveries and inventions, and greatly enlarged in the latest edition of 1853. This is a book of vast research, and the variety of subjects embraced in it may be estimated from the fact, that on the French translation it was thought advisable to employ twenty-six *collaborateurs*, all regarded as adepts on their special subjects. Dr. Ure thus honourably occupied a position in scientific work analogous to the literary feat of Dr. Johnson, who, single-handed, produced his *English Dictionary*, the counterpart of which was the united labours of the French Academy.

For the last thirty years, Dr. Ure was in the habit of performing most of his analyses by means of standard solutions of the different re-agents, upon which system his method of alkalimetry is based.

The most remarkable characteristic in Dr. Ure was his indefatigable industry and his enthusiasm in the laborious researches of his profession. He was also distinguished for the originality of his adaptation of the principles of science to many commercial pursuits, and was frequently consulted by manufacturers in the arrangement of their apparatus and the construction of their factories; which avocation, while it enabled him to make his scientific experience practically useful, tended also to enlarge his stock of knowledge, and afforded materials for his celebrated *Dictionary of the Arts and Manufactures.*

During the last three or four years of his life, Dr. Ure was obliged, on account of the state of his health, to retire from the more active professional exertions in which he had for many years been engaged; but, while his bodily infirmity gradually increased, his mental faculties retained their activity, and, until within a few days of his decease, he was occupied with his chemical pursuits, and in correspondence with those who were desirous of obtaining his professional advice.

Dr. Ure died on the 2nd of January, 1857, after a few days' illness, at the age of seventy-eight; and his funeral took place on the 9th, at Highgate Cemetery.

BOOKS RECEIVED.

Bulletin de la Société Botanique de France, *Fondée le 23 Avril*, 1854 (3 vols.). Paris: Au Bureau de la Société.

An Essay on the Therapeutical Effect of Purgatives on the Horse. Read before the Veterinary Medical Association of London, Session 1855-6, to which was awarded the Society's Silver Medal. By John Field, M.R.C.V.S. London: Longmans and Co. 1856.

On the Drainage and Sewage of London and of large Towns. By James Copland, M.D., F.R.S., &c. London: Longmans and Co. 1857.

First Report of the Clinical Hospital for Diseases of Children, Manchester: *containing an Account of the Results of the first* 530 *Patients there treated.* By A. Schoepf Merei, M.D., &c., and J. Whitehead, M.D., &c. Manchester: Bradshaw and Blacklock. 1856.

TO CORRESPONDENTS.

THE ILLNESS OF THE SECRETARY OF THE PHARMACEUTICAL SOCIETY.

The serious illness of the Secretary having obliged him rather suddenly to relinquish his duties, with very little prospect of his being able to resume them, the Correspondence of the Society has unavoidably been thrown into some temporary confusion. In case any Members or Associates should have to complain that their letters have not been punctually answered, or that the answers were incomplete, we hope the unfortunate circumstance above mentioned will be received as a sufficient explanation. From the experience of Mr. Smith in the affairs of the Society, with some of which no person was so conversant as himself, his removal from the office he has filled for so many years will, of necessity, occasion some inconvenience until the needful arrangements have been made for supplying his place. In the mean time, it is requested that post-office orders forwarded to the house of the Society be made payable to Mr. W. L. Bird (the Vice-President), who will take charge of the financial department until the regular appointment of a Secretary. Mr. Thomas Hawksby is appointed to the office of Secretary and Registrar *pro tem.*

R. H. A.—*Purification of Essential Oil of Bitter Almonds.* Vol. xiii., pp. 277 and 597.

A. B. (Durham).—(1.) *Pharmacopœia Londinensis* is one of the books.—(2.) Fownes's *Manual of Chemistry*, Royle's *Materia Medica*, and Balfour's *Botany*.

W. H. (Longton).—(1.) Yes.—(2.) Horne and Thornthwaite, Newgate Street.

G. H. R. (Wellingborough).—Taylor *On Poisons.* 12*s.* 6*d.* Churchill.

T. L. (Derby).—The question is too obvious to require an answer.

N. T. (Sunderland).—(1.) Lindley's *Introduction to Botany.*—(2.) The Natural System only is necessary.

J. R. T. (Thirsk).—Areca nuts are astringent, containing a large proportion of tannin. We never heard of their use as an anthelmintic.

A Registered Apprentice (Narbeth).—(1.) No.—(2.) Lindley's *School Botany* would answer the purpose.

Inquirer (Ilkeston).—Royle's *Manual of Materia Medica*, Balfour's *Manual of Botany.*

G. (Preston).—Beasley's *Formulary.* Price 6*s.* Published by Churchill.

Capillator.—We do not know the preparation alluded to.

C. C. (Norwich).—(1.) In the mixture alluded to, the gum should be made into a mucilage, and the turpentine added very gradually; and, when well mixed, the syrup, and finally the remainder of the water.—(2.) In making decoction of bark, the quantity lost by evaporation is not ordered to be made up by the addition of more water.—(3.) Lindley's *Elements of Botany.* 12*s.*

D. (Walton).—Apply by letter to the Secretary of the College of Surgeons, Lincoln's Inn Fields.

Juvenis (Bradford).—Ivory balls may be stained red by imbuing them first with the tin mordant (solution of nitromuriate of tin), and then plunging them in a bath of Brazil wood, cochineal, or a mixture of the two.

W. L. (Dundee).—We are unable to give the information.

J. H.—If the citrates are well made before being mixed, no difficulty ought to be experienced.

Sigma (Leamington).—There will be an article on the subject in next month's Journal.

Effects of Sulphur in Gas.—In reference to the controversy on this subject, we have been requested to insert the following quotation from the French edition of Berzelius's *Traité de Chimie*:—"Sulfate cuivrique—cristaux bleu saphir foncé, contenant 5 atomes, ou 36 pour cent d'eau. * * A+40 degrés et au-dessus, il perd peu à peu 2 atomes d'eau, devient blanc, et se réduit en poudre au moindre contact." Those of our readers who are interested in the subject will discover the application of this quotation, which has already been imperfectly given.

We have received letters—From Mr. Walker, on Pharmaceutical Legislation; Mr. Duncan and "Anglo-Saxon," on the Education and Labours of Apprentices; Mr. Lowe, on the Sale of Poisons; T. S. D., on Protracted Labour and Study. We regret that our space admits of only this acknowledgment at present. The subjects will not be forgotten.

A sample of genuine wholesome bread from Mr. Stevens has been received, and eaten.

Errata.—Page 373, line 23 from top, *for* Fillœa suaveolius, *read* Fillæa suaveolens.—Page 370, *for* Guibourtia Copalliferæ, *read* Guibourtia Copallifera; bottom line, *for* bractex, *read* bracta.—In the Council of the College of Dentists, page 390, *for* John Gray and John Imrie, who declined to serve, *read* W. L. Canton and Mr. Hunt.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd) to Mr. Churchill, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XVI.—No. IX.—MARCH 2nd, 1857.

THE MEDICAL BILL FOR 1857.

SEVERAL meetings of the Delegates of the Medical Corporations of London, Edinburgh, and Dublin, have taken place at the College of Physicians of London, for the purpose of arriving at a decision as to the general principles of a Medical Bill to the satisfaction of all parties. The result is about to be brought forward in the House of Commons, with a better prospect of success than any measure recently proposed on this subject. During the preliminary deliberations, a difficulty arose in some of the details, chiefly in reference to the mode in which the rights and privileges of some of the existing Corporations were to be protected under the new arrangement. These obstacles have, we believe, been surmounted, and a general concurrence has taken place with regard to the more important principles of the measure.

After reciting the title—namely, "The Medical Act of 1857"—and fixing the date at which it is to take effect—August 1st—certain Acts or parts of Acts enumerated in Schedule A are repealed. The 4th section provides for the appointment of a "General Council of Medical Education and Registration ot the United Kingdom," consisting (sect. 5th) of Representatives of the Medical Corporations and Universities of the United Kingdom and of persons whom Her Majesty, with the advice of Her Privy Council, may appoint. The precise constitution of this Council is not finally settled; but it is understood that the decision of these details is referred to the Members having charge of the Bill in the House of Commons.

The General Council is to comprise Branch Councils for England, Scotland, and Ireland respectively; and the several arrangements for registration, examination, &c., are to be complete in each of the three sections of the United Kingdom.

A limited period of time is to be allowed for the registration of persons in practice prior to the date of the Act, on payment by each person of a fee of ten shillings, one register being provided for Physicians and another register for Surgeons and Apothecaries, the forms of which are defined in Schedule E. Practitioners after the date of the Act are to pay a larger fee (from three to six guineas), and any practitioner on removing his residence from one section of the United Kingdom to another, is to have his name transferred to the register of his present locality, on payment of a further fee of ten shillings. The registers are to be published annually in the month of February, and are to be admissible as evidence of qualification in the courts of law. A preliminary examination in general education is provided for all persons not having taken the degree of Master of Arts, or obtained a qualification held to be equivalent to it, or satisfactory to the Branch Councils: and the medical Registrars shall require proof that each candidate for registration as a Physician has attained the age of twenty-four—as a Surgeon, the age of twenty-one, and that all have been duly examined and certified by the respective colleges to which they claim to belong.

The Board of Examiners in England is composed of an equal number of Examiners appointed by the Royal College of Physicians of London, and the Master and Wardens of the Society of Apothecaries. The Boards for Scotland and Ireland respectively are to be constituted in a similar manner by the corresponding corporations of these sections of the United Kingdom. The number and nature of the several examinations are stated, and provision is made for securing uniformity of education, by equalizing the fees, and by giving the General Council a superintendence over each of the Boards of Examiners in the three sections of the United Kingdom, with power to suspend the privileges and powers of the Examiners in case of neglect of duty or infringement of the prescribed regulations.

The privileges conferred by registration under the Act may be briefly stated to be the right to assume or use the name or title under which registration is granted, the power to grant medical or surgical certificates, and to hold a corresponding office in any public institution. In the case of persons registered as Surgeons, the power of recovering fees and remuneration for professional services is also conferred. After the passing of the Act no unregistered person is to be entitled to recover such charges or remuneration, to hold any such office, or to assume or use any name or title, &c., implying that he is registered under the Act. The penalties for infringement of the Act are to be recoverable before any two Justices of the Peace acting in and for the county, city, or place in which the offence has been committed. Penalties and other punishments are provided for fraudulent representations, falsifications of the registers, &c. Powers are enacted for granting new charters to the Colleges of Physicians of England, Scotland, and Ireland respectively, with some other provisions of minor importance, which need not be here enumerated.

The 41st section is as follows :—

> Nothing in this Act shall extend or be construed to extend to prejudice or in any way to affect the lawful occupation, trade, or business of Chemists and Druggists.
>
> Sect. 42.—Nothing in this Act contained shall interfere with the privileges of duly licensed Apothecaries in Ireland.

On reference to the Apothecaries Act of 1815 (55 Geo. III., cap. cxcix.), of which it is proposed to repeal nineteen sections enumerated in Schedule A, we observe that the 28th section, exempting Chemists and Druggists from interference by that Act, is left in full force, while the 20th section, which is the one imposing a penalty for illegally practising as an Apothecary, is among those to be repealed. The question what is the lawful occupation, trade, or business of Chemist and Druggist remains where it was ; but the power to prosecute being no longer vested in the Master and Wardens of the Society of Apothecaries, the source of litigation hitherto existing appears to be removed, and is replaced by the following section, which we therefore quote entire :—

> Every person not registered under this Act who shall wilfully and falsely pretend to be, or take or use any name, title, admission, or description implying that he is registered under this Act, or that he is recognized by law as a Physician, or Surgeon, or Apothecary, or a Practitioner in Medicine, shall, on being summarily convicted of every such offence before any two Justices of the Peace for the county, city, or place where the offence was committed, pay a sum not exceeding twenty pounds, nor less than five pounds, to be recoverable as hereinafter directed.

We do not observe any provision stating by whom, or in whose name proceedings are to be taken under the Act,—an omission which is probably accidental, as it is usual to make some public officer or body the cat's-paw in such cases, which is better than leaving this responsibility to be exercised by common informers or rival tradesmen. Under any circumstances, the initiative is almost invariably taken in actions of this nature by some interested party; but a provision that any such proceedings should be instituted by, or in the name of, the Registrar of the section of the kingdom in which the offence was committed, would, to some extent, be a check upon malicious or vexatious litigation.

THE DENTAL PROFESSION.

Last month we briefly noticed the inauguration of the Odontological Society, and described the general principles on which it is founded. In another part of this number is a report (quoted from the *Times*) of the inauguration of the College of Dentists. The statement that the room was "crowded by all the leading Dentists of the metropolis," is not strictly correct. The same remark was made in the reports of the meeting of the other society, yet not more than three or four members of the profession attended *both meetings*. The members of the Odontological Society were invited to attend the inauguration of the College, but did not avail themselves of the opportunity. The two movements are therefore entirely distinct and isolated; and the zeal, energy, and labour which, if concentrated into one channel, might have ensured the early accomplishment of the object desired, are tending towards division and antagonism. Mutual disclaimers of hostile feeling, and professions of fraternity, must be taken for as much as they are worth, and no more: the DUALITY of the profession is a misfortune which, like a "sandcrack" in a horse's hoof, cannot fail to cause lameness, and this lameness is likely to increase unless the crack be cured. The symptoms of inflammatory action may for a time escape observation; but, so long as the latent elements of disunion exist, a rupture may at any time break out on the occurrence of a contusion or any other exciting cause. Although each section of the profession may shut its eyes to the existence of the other, the public watch the proceedings of both, and can arrive at but one conclusion, which is, that the profession is divided against itself.

The following paragraph, in a pamphlet just published by Mr. Samuel Lee Rymer, one of the Secretaries of the College of Dentists, reduces the question at issue to a tangible form; and, the gauntlet being thrown down, it is right to weigh the respective merits of the rival reformers in the balance.

> "But it is time to inquire how much the profession may be made to benefit by the recent movement, and in what way. There are still many of its members undecided as to whether they shall join the College or the private society. This is only amongst those who have not been fully informed as to the character of the two bodies. An educational institution is the acknowledged desideratum; and, even supposing that a connexion with the College of Surgeons is desirable, it could not be accomplished through the agency of the Odontological Society; they would have to become incorporated with the College of Dentists, *in order to obtain the sanction of a constitutionally established body*. An INDEPENDENT existence is, however, demanded by the profession; and it is in obedience to this demand that the College of Dentists of England has been established. It were heartily to be wished that fruitless opposition should *now* cease, and that *all* should unite to hasten the time—which must inevitably arrive—when the College shall become a national institution, and when no man will be recognized as a qualified dentist unless he has received authority to practise as such from its faculty.
>
> "The government of the College is in safe and efficient hands—a most important point at the outset. *Organisation* is in steady course of accomplishment, a correct system of education will follow, and the consummation of all will be seen in the elevation of the character of the dental profession by the authority granted to the College of Dentists of England as an INCORPORATED BODY."

This is not an official document, but it indicates the manner in which not only the Odontological Society, but also the College of Surgeons, is about to be eclipsed by the College of Dentists of England.

Although the Odontological Society has been, as we think, justly animadverted upon for the too exclusive tendency of its regulations and conditions of admission, it cannot be denied that it comprises among its founders the leading Dentists of the metropolis, and the number of Members amounts at the present time to about eighty. Yet this nucleus of a professional Society, with its list of influential supporters, is disposed of and extinguished by the passing remark that the object desired could not be accomplished through its agency. The College of Surgeons is dealt with in a similar manner; and the College of Dentists, repudiating connexion with the medical profession, claims the distinction of enjoying an INDEPENDENT existence. It aspires to be an educating body, and has become possessed of the rooms and chattels lately occupied by the Chemical Society in Cavendish Square, where the education required for preparing candidates for the diploma of the College will be conducted. The medical schools and the curriculum of education recognized by the College of Surgeons will be superseded, and the education is to be adapted to the peculiar requirements of the Dental profession. The lectures already announced are—three on Surgery, by a gentleman favourably known to candidates for examination at Apothecaries' Hall—(we abstain from using the term "grinder" for obvious reasons); three on Histology, by a gentleman who has written a small work on the subject; two on Anatomy; and one on Dental Mechanics. It is not improbable that these courses of lectures will be considerably extended; and that, when the College has had time to educate a supply of Dentists, a professor may be found among them to occupy the chair of Dental Surgery. It would, therefore, be premature to pass judgment upon the curriculum of Dental education at present; but we may safely predicate that the premises of the new College do not afford accommodation for entering into competition with the Medical Schools; and that, if the College is to stand or fall according to its efficiency as an educating body, the privilege of an independent existence will be purchased by its members at the expense of professional status, and the occupation of a Dentist will be reduced to a craft, instead of being an integral part of a profession.

It is not, however, in the capacity of an educating body that a Corporation of Dentists is wanted. Every facility for the professional portion of a Dentist's education exists in the medical schools; and the only fault found with this education is, that it is too complete—that it comprises an amount of medical knowledge not required by the Dentist. The same objection applies equally to the study of mathematics, classics, and other branches of refined education having no direct relation to the medical art, but usually cultivated as a kind of mental gymnastics, to develop the faculties and complete the education of a gentleman. The object of ambition should be—not to discover the *minimum* of knowledge with which it would be possible to draw teeth, carve ivory, and stamp gold, but to fix on a standard of general, professional, and special qualification, which shall command the respect and confidence of the public. This standard being settled and enforced by a prescribed examination, the supply of education would keep pace with the demand without the intervention of an educating corporation.

The most important object to be attained is the union of the dental profession into ONE BODY, and this body should, as a matter of course, comprise the leading Dentists of the metropolis and the provinces, with as large a number as possible of those who at the present time are recognized and practising as Dentists throughout the kingdom. It would be a mistake to require in the first instance that high standard of professional ethics which at a future time may be desirable. This would limit the Association to a select drawing-room coterie; a result which the Odontological Society should guard against. The profession must be taken as it is, with a broad base. The beneficial influence of the Association would then be secured by the united efforts of all its members in promoting the desired reformation.

BOY DISPENSERS.

The employment of boys to dispense prescriptions has given rise to rather severe comments, in the general tenor of which we fully concur, as serious accidents have in several recent instances been traced to this source. But the editorial remarks on this subject in the *Medical Times and Gazette* of Feb. 14th seem to require notice, as they imply a sweeping charge against Dispensing Chemists which is not founded on fact. We are given to understand (on the authority of *Punch*) that it is a usual practice in Chemists' shops to entrust the duties of dispensing, retailing of poisons, and even counter-prescribing, to boys who have not served an apprenticeship.

> "In a word," we are told, "the prevailing notion seems to be that anybody, young or old, gentle or simple, learned or ignorant—that a boy who absolutely cannot be taught to twist thread, or wrap up a pound of tea—can at any rate perform duties upon the accuracy of which health and life depend."

The writer proceeds to observe that—

> "The remedy is in the hands of the customers themselves. Those who frequent the shop of the dispensing druggist should keep a sharp look-out as to who serves; and if they see a boy serving, the common-sense rule is, Go there no more. . . . . . We recommend, further, the professional prescriber to take his share in stopping this absurd iniquity. It is his duty to let no patient leave the consulting-room without warning him not to obtain medicines from any boy-dispensing factories."

This is rather a severe attack upon the Apothecaries. Those Dispensing Chemists who take apprentices, usually have other employment to occupy their attention during the early part of their time, without requiring them to take a share in the responsibility of dispensing prescriptions. There may occasionally be an exception, but as a general rule the Chemist's apprentice is engaged for two, three, or four years in his preliminary training before he is permitted to dispense any prescriptions, and then he is gradually initiated into this duty under the inspection of his employer or a competent Assistant. With the Apothecary, however, the case is different. The apprentice has little to do in the dispensary besides preparing the medicines prescribed daily by his employer, whose professional engagements require his frequent absence from home. While the Apothecary is visiting his patients, his apprentice is thrown upon his own resources. He has no instructor or qualified assistant to whom to apply in case of difficulty, and his employer can scarcely be expected to superintend the dispensing of all the prescriptions which he writes. In fact, it would be much less trouble to prepare the medicine himself, than to stand over a boy to see him do it. If then the apothecary fulfil his duty to his apprentice, by allowing him the opportunity of dispensing medicine—and this is the customary duty of Apothecaries' apprentices—the patients are more or less in danger of the evils so severely censured in the *Medical Times*. And as it is only by practice that skill can be acquired, it is not to be expected that a youth who has only one practitioner's prescriptions to dispense, can be as expert as the Chemist's apprentice, who, after having undergone the preliminary training, is gradually initiated into the art and mystery of dispensing the prescriptions written by different hands.

Without, therefore, wishing to make an invidious comparison, we may affirm that the liabilities pointed out in reference to Chemists' apprentices apply with even greater force to the establishments of Apothecaries, where the apprentice, and in some cases the errand-boy, assists in the manipulations of the dispensary.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES (*continued*).

Elected in January.

MEMBERS.

London	Brewer, John William N. T.
Northampton	Lingwood, James Grace
Pimlico	Vizer, Edwin Bennett
Rugby	Garratt, Samuel
Stourbridge	Bland, John Handel

MAJOR EXAMINATION.

Marks, Nelson Samuel	Swansea

MINOR EXAMINATION.

Grimwood, William	Ipswich

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH	TOWNS.
Bagshaw, James	Mr. Handley	Wakefield
Brereton, Matthew Bayfield	Mr. Mabson	Great Yarmouth
Campbell, Robert	Mr. Mackay	Galashiels
Cole, Alfred C.	Mr. Groves	Hammersmith
Holmes, William C.	Mr. Hocken	London
Lavers, Thomas F.	Mr. Lavers	Lewisham
Midgley, John James	Mr. Reinhardt	Hull
Martin, Benjamin	Mr. Handley	Wakefield
Reed, Alfred	Mr. Gordelier	Sittingbourne
Sheriff, Thomas	Mr. Macfarlan	Edinburgh
Trewavas, Richard J.	Mr. Job	Truro
Wall, John T.	Mr. Butcher	Cheltenham
Young, John	Mr. Mackay	Galashiels

Elected in February.

MEMBERS.

Brighton	Hornsby, George Greenwood
Guildford	Shepherd, George Prentis
London	Medlock, Henry
Newcastle (Tyne)	Procter, Barnard Simpson

MAJOR EXAMINATION.

Scholefield, Arthur	Basingstoke

MINOR EXAMINATIONS.

Cortis, Edward Charles	Worthing
Cutting, Thomas John	Selby
Glass, John T.	Ryde
Robinson, John	Woolwich
Sarsfield, William	Durham

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH	TOWNS.
Bell, Joseph Alfred	Mr. Noakes	Brighton
Foggitt, Thomas	Mr. Smeeton	Leeds
Mason, John	Mr. Mason	Hastings
Watts, John Newton	Mr. Watts	London

PHARMACEUTICAL MEETING,

Wednesday, February 4th, 1857,

MR. JACOB BELL, PRESIDENT, IN THE CHAIR.

The following donations were announced:—

Journal of the Society of Arts, from the Society.
Journal of the Photographic Society, from the Society.
Specimen of Wild Senna, from Dr. Martius.
Specimen of Mezereon Bark, from Mr. Whipple.
Specimen of Nitrate of Oxide of Methyl, from Mr. Macfarlan.

The following papers were read:—

NOTE ON *PANNA* OR *RADIX UNCOMOCOMO*, THE CORMUS OF *ASPIDIUM ATHAMANTICUM*, KUNZE.

BY DR. THEODOR MARTIUS,

Professor of Pharmacy and Pharmacognosy in the University of Erlangen, Hon. Mem. of the Pharmaceutical Society of Great Britain.

Communicated by Mr. Daniel Hanbury.

During the last few months some attention has been directed to a South African remedy for tape-worm, called *Panna* or *Radix Panna*, for which an absurdly high price has been asked.

This drug is identical with the *Radix Uncomocomo*, which so long ago as the 24th May, 1851, was exhibited by Mr. J. C. E. Raabe at the second session of the Apothekerverein of North Germany, assembled at Hamburg. The first printed account of this famous remedy for tape-worm, occurs in the *Archiv der Pharmacie*, Bd. 117, p. 91. There we find as follows:—

> M. Raabe laid before the meeting a fern root (as *Radix Filicis incognitæ*), of the origin of which nothing was known but that it had been sent from Port Natal. A specimen of the powdered root, contributed by Dr. Bley, has the aspect of rhubarb; its taste is at first sweetish, afterwards bitterish; its odour is slight, but resembles that of the root of male-fern.
>
> From the outward appearance, the root seems to be that of a fern, perhaps of a species of *Polypodium*.

The supposition of the root being that of a fern, is correct. I had devoted some attention at that time to South African Materia Medica, and announced subsequently that a root which had reached me under the name of *Radix Uncomocomo* (and which was employed as an approved remedy for tape-worm by the Zulu-Kaffirs) was identical with the root laid before the assembly of Apothecaries at Hamburg in 1851.*

Quite recently there has appeared from the pen of my esteemed colleague Dr. Berg, of Berlin, some notes on a microscopic examination of the *Panna*,† from which it is not difficult to discover that this root is none other than my before-described *Radix Uncomocomo*. As I have announced in my paper that *Aspidium athamanticum* Kunze is the source of *Uncomocomo*, so I may add that there can be no doubt that the nameless fern-root of Hamburg received the designation of *Panna*. Hence it is quite needless to bestow on the plant affording *Panna*, as has been proposed by Dr. A. Lucanus, of Halberstadt,‡ the name of *Aspidium Filix Panna*, since it is evident that the point of botanical origin has been already determined

For the benefit of those who may desire to procure this remedy at a reasonable rate, I may mention that Mr. J. C. E. Raabe, of Hamburg (Deichstrasse, No. 45), is in possession of a quantity, and that some London houses have likewise a supply of the drug obtained from the same source.

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* *Pfälzer Jahrb.* 1852, Bd. 24, pp. 232-235.
† *Deutschen Klinik*, No. 46, 15 Nov.
‡ *Archiv der Pharmacie*, Bd. 138, Nov. 1856, p. 173.

[*Note by Mr. Daniel Hanbury.*—Some particulars relative to the drug which forms the subject of the foregoing paper, having been communicated to me by my friend the Rev. H. Callaway, M.D., of Pietermaritzburg, Natal, I take this opportunity of presenting them to the Society. I believe, however, that the drug in question is but little deserving the serious attention of the European practitioner, since equally efficacious remedies of the same class are far more easily within his reach. The following is an extract from Dr. Callaway's communication:—

"Before receiving your letter, I had made myself acquainted with the fern the Kafirs use as a vermifuge, and prepared a frond to be sent to England. I have since procured by means of a Kafir, named Umbapi, a refugee from Panda's tyranny, three roots with their fronds, which I intend to send to you entire. I have taken one frond of the large root and dried it as you requested, and shall mark it accordingly. The proper orthography of the fern is *Inkomankomo.* The *k* is used in Kafir to express the *k*-sound on all occasions. The *c* is used to express a *click*-sound, made by placing the tip of the tongue against the teeth and withdrawing it, very much as when one expresses disapprobation to a child.

"The *Inkomankomo* is found in the margin of holes, left by the Ant-bear after spoiling the Termite ants, of which large numbers are found in the country. It is a handsome fern; you can scarcely judge of its natural appearance from the dried specimen. Of its powers as a vermifuge, I have had no practical experience, as I trust to Turpentine, for which I have frequent application from Kafirs who have become acquainted with the efficacy of the white doctor's remedy. This morning I asked a Kafir who came for medicine to expel tape-worm, whether he would have *my* medicine or *Inkomankomo?* He turned up his nose with great contempt and said,—*Not Inkomankomo!* * * *"

Dr. Callaway adds that the dried rhizome of the fern having been ground to powder, is administered by the Kaffirs, in milk or milk and water, and taken fasting. Sometimes the mixture is allowed previously to ferment.

Dr. C. concludes his observations thus:—

"From what they [the Kafirs] say as to it only expelling those worms that *gripe,*—the uncertainty of the symptoms on which they rest their diagnosis,—and the fact that tape-worms are not always seen after taking *Inkomankomo,* it is probable that it is very often given for abdominal pains, where there are no worms."

It may be as well to state that the fern in question, *Aspidium athamanticum* of Kunze, is regarded by Mr. Thomas Moore as more properly belonging to the genus *Lastrea,* and accordingly named by him *Lastrea athamantica.**—D. H.]

Mr. Allchin noticed the fact that the plant described by Dr. Martius belonged to the same genus as the male fern, which it appeared to resemble in its medicinal effects. He thought it interesting that the two substances should have been employed for the same purpose in different parts of the world.

ON THE DETECTION OF STRYCHNINE IN CASES OF POISONING.

BY DR. J. E. DE VRY,
Lecturer on Chemistry; and
E. A. VAN DER BURG,
Pharmaceutical Chemist of the Rotterdam Hospital.

In the month of September, 1856, we were required by the *Juge d'Instruction* to make a chemical investigation of the contents of the body of a man, on the cause of whose death there was some suspicion of poisoning. The man having been brought to the hospital in a tetanic state, we were naturally induced to try to find strychnine in the contents of the body; but neither this nor any other poison was to be found, so that the death of this man remained unexplained.

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* *Hooker's Journ. of Botany,* Vol. V. (1853), pp. 226, 311.

The discordant opinions of several chemists in the famous trial of Palmer, made it necessary, for our own persuasion of the truth, to institute a series of experiments, to make out:—1st. The sensibility of the principal reagents on strychnine; 2nd. The possibility of detecting strychnine with these reagents, if the strychnine is mixed with animal substances; 3rd. If strychnine can *always* be found in the corpse of an individual poisoned by it.

1st. Sensibility of the principal reagents on strychnine: *Chromate of potash or ferridcyanide of potassium and concentrated sulphuric acid.*—By these reagents $\frac{1}{60000}$ of a grain of strychnine can be detected, if one drop of a solution, containing one grain of strychnine in 60,000 grains of water, is evaporated in a small porcelain dish on a water-bath, and the remaining substance moistened with the smallest possible quantity of pure concentrated sulphuric acid. By introducing in this solution a *very small* fragment of a crystal of bichromate of potash or ferridcyanide of potassium, and moving this fragment with a glass rod in the solution, a beautiful dark purple colour is produced on every part of the surface of the porcelain that has been in contact with the acid solution, and the fragment of one of the two salts.

Bin-iodide of potassium, and iodide of mercury and potassium.—By a solution of one of these compounds, $\frac{1}{50000}$ of a grain of strychnine can be detected. These reagents, like the following, possess only the ascertained sensibility, provided the drop of liquid is contained in a capillary test-tube, in which the liquid, although only a drop, forms a small column, in which the formation of a precipitate can be observed by comparison with a similar capillary tube filled with pure water, and mixed with the reagent.

Tannic acid reveals $\frac{1}{25000}$ of a grain of strychnine.

Solution of chlorine in water, $\frac{1}{3000}$.

Sulphocyanide of potassium, $\frac{1}{3000}$.

Neutral chromate of potash, $\frac{1}{3000}$.

The precipitate formed by bin-iodide of potassium is brownish-red, and if dissolved in weak warm spirit, acidulated by sulphuric acid, beautiful crystals are formed of sulphate of iodo-strychnine, which polarize the light, as has been discovered by Mr. Herapath. The precipitate formed by iodide of mercury and potassium, by tannic acid, and by solution of chlorine in water, are white. This last reagent must be used in relative large quantity, and the precipitate formed by it does not appear immediately.

The precipitates formed by sulphocyanide of potassium and neutral chromate of potash are both crystalline. The colour of the former is white, and the form of the crystals observed by the microscope is very characteristic. The colour of the latter is a beautiful yellow. The formation of both these precipitates is accelerated by rubbing the surface of the tube with a glass rod.

The precipitate formed by chromate of potash gets immediately a dark purple colour, if moistened by concentrated sulphuric acid. *All* the other precipitates get the same colour if they are dissolved in a small quantity of strong sulphuric acid, and the solution brought into contact with a fragment of a crystal of chromate of potash or ferridcyanide of potassium.

2nd. The possibility of detecting strychnine, if mixed or combined with animal substances.

In all the following experiments, the method of Professor Stas was used. This method, by which all organic basic poisons can be detected, consists in treating the animal substance which is supposed to contain a poison, with spirit of wine, acidulated by pure oxalic or tartaric acid. The tincture, after having been filtered, is evaporated at a gentle heat on a water-bath, and the remaining substance dissolved in anhydrous alcohol. This solution filtered, and again evaporated, and the remaining substance dissolved in water. The watery solution, after having been filtered and partly evaporated, is saturated with bicarbonate of soda, and afterwards repeatedly agitated with ether, which is made alkaline by a small quantity of caustic potash or soda. If there is any basic organic poison present in the animal substance under examination, it will be obtained by evaporating the ethereal solution, and may be afterwards tested by several reagents to find out its nature.

1*st Experiment.*—A solution of ¼ of a grain of strychnine mixed with 6 ounces of fresh meat. The poisoned meat treated as mentioned, afforded small crystals of strychnine, of which the identity was proved by the reagents mentioned.

2*nd Experiment.*—The white and yellow of one egg were mixed with ¼ of a grain of strychnine, and this mixture coagulated by the heat of boiling water. The coagulum being treated according to Stas's method, *almost the whole quantity* of the strychnine was recovered in white crystals.

3*rd Experiment.*—The urine of 24 hours from a patient in the hospital, to whom the physician administered every day ½ grain of nitrate of strychnine, was divided into two equal parts, and one of these parts mixed with ¼ grain nitrate of strychnine. The two parts treated in the same way as described by Messrs. Graham and Hofmann,* by digesting and agitating during 24 hours with animal charcoal, &c., that part in which ¼ grain of the strychnine-salt was dissolved, afforded us crystals of strychnine, *whilst we could not find the least trace in the other part.*

4*th Experiment.*—On the 15th of September, ½ grain of strychnine was administered to a young dog. Twenty minutes after the introduction of the poison, its action commenced by vehement tetanic spasms, salivation, and excretion of urine, and ten minutes later the dog was dead.† The stomach, liver, gall, bladder, spleen, kidneys, intestines, and blood were taken from the body and separately examined on the 18th September, when they all were in full putrefaction. The result of this investigation was, that a comparatively large quantity of strychnine was obtained from the stomach, whilst *no one of the other entrails* contained the least trace of this poison.

3rd. Can strychnine *always* be found in the corpse of an individual poisoned by it?

After we had proved that the least trace of strychnine could be detected if it was really present, we desired to get the conviction if poisoning by strychnine could *always* be proved by the aid of chemistry. The following experiments were executed with a view of determining this point:—

1*st Experiment.*—A middle-sized dog was poisoned by introducing a solution of nitrate of strychnine in a superficial wound. Immediately after death 4 ounces of the blood were treated according to Stas's method, but not the least trace of strychnine could be detected.

2*nd Experiment.*—On the 26th September we administered to a small dog weighing about 8 pounds, at 10 o'clock in the morning, $\frac{1}{30}$ grain of strychnine mixed with $\frac{1}{15}$ grain of tartrate of antimony and potash. This dose was repeated twice on the following day, at 9 o'clock in the morning, and at 4 o'clock in the afternoon, without any symptom. On the following day the dose was repeated at 9 o'clock, and again at 12 o'clock in the morning, and at 1 o'clock the dog had a violent attack of tetanus, accompanied by salivation and ejection of urine. This ttack lasted some minutes, and was soon followed by a second, which was still nore violent. At 3 o'clock the dog got a third, and at 8 o'clock a fourth lose of poison, each of which was followed by an attack of tetanus, one hour fter the introduction of the poison. On the 30th of September the situation of he dog was much better compared with that of the preceding evening. At 10, and gain at 12 o'clock, a dose of poison was administered, which doses were followed ow and then by spasmodic contractions, whilst it appeared that the irritability f the nerves was much increased, for the dog jumped up or trembled at the ast noise. At 2 o'clock in the afternoon a third dose of poison was given, hich was followed at half-past 2 and half-past 3 o'clock by attacks of etanus, the latter lasting ten minutes. The fourth dose was given at alf-past 5 o'clock. One hour later the dog got the most vehement attack of etanus, accompanied by salivation and ejection of urine and fœces, which lasted quarter of an hour, and terminated by the death of the animal. This death as caused by a chronic poisoning, begun on the 26th of September, and terminated on the 30th of September, in which lapse of time the dog got no more han $\frac{14}{30}$ths of a grain of strychnine, and $\frac{28}{30}$ths of a grain of tartrate of antimony and potash, which small dose of poison caused seven attacks of tetanus. fter each attack the widely-extended hind feet were much stiffer than the fore eet.

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* *Annalen der Chemie und Pharmacie*, Bd. 83, S. 39.

† The *same dose* of poison, mixed with half an ounce of animal fat, was administered to another dog of somewhat larger size, for the purpose of testing the assertion of Dr. Pindell, published some time ago in the *American Journal of Pharmacy*, that fat would neutralize the tonic effect of strychnine. The result, however, proved fatal to the animal, which died an hour and a quarter after the ingestion of the poison.

In this experiment, the admixture of fat to the poison had no other effect than to *retard* (and not to neutralize) its mortal effect.

The *post-mortem* examination of the body, which was very carefully performed y the distinguished Assistant-Physician of the Rotterdam Hospital, Dr. Schmidt, roved that there was nothing abnormal to be found which could even lead to he suspicion that death had been caused by the administration of a poison. he chemical analysis of all the parts of the body led to the same negative conclusion, for not the least trace of strychnine could be detected, notwithstanding he great sensibility of our reagents which was proved in the former experiments.

From the alleged facts we may be justified in making the following

CONCLUSIONS.

1. That the method which we pursued for detecting strychnine was adapted to discover the least trace of the poison, for even only $\frac{1}{60000}$ of a grain could be detected.

2. That even when the strychnine is combined with albuminous matter, nevertheless, the *whole* quantity can be separated by the method of Stas, if properly conducted.

3. That if death has been caused by strychnine, this poison can be detected in the body, provided it has been ádministered in a quantity *more than sufficient* to cause death.

4. That if the poisoning by strychnine has been chronic, and has resulted from a quantity not greater than just necessary to cause death, the cause of this death *cannot be proved*, either by the *post-mortem* examination of the body, or by a chemical investigation of the intestines.

5. That it appears to be highly probable that that part of the strychnine which acts mortally is decomposed in the living body.

6. That the urine of patients who take strychnine or its salts as a medicine, contains not a trace of this poison.

Rotterdam, 8*th January*, 1857.

Mr. REDWOOD said that the results described in this paper differed from those hich had been obtained by other Chemists under similar circumstances. everal Chemists had detected strychnine in the urine after its administration y the stomach.

Mr. RODGERS (Lecturer on Chemistry at St. George's School of Medicine) bserved, that he had paid especial attention to the subject of the detection of oisons, and particularly of strychnine, and that the results and conclusions of e authors of the paper just read, were at total variance with his own and that of Mr. Girdwood, with whom he had made an extensive series of experiments, the results of which and the processes adopted, had already been made public. He did not consider that the process adopted by the authors was of sufficient delicacy to extract strychnine from blood and tissues of the body, a view that was confirmed by the fact that they had failed to obtain evidence of the strychnine in their experiments, where half a grain of strychnine was administered to a young dog, in any other analysis beyond the contents of the stomach, and had utterly failed to obtain any indication of its presence in the urine of patients taking strychnine, while Drs. Wrightson, Letheby, Ogle, and Mr. Herapath, as well as himself and Mr. Girdwood, had never experienced the slightest difficulty in separating strychnine from all parts of fluids of the body subjected to analysis.

He further observed, that he did not consider the manner of their applying the test of sufficient delicacy to detect the minute quantities of strychnine that could be obtained from the tissues and fluids of the body, it being frequently necessary in such cases to apply sulphuric acid containing a minute quantity of chromic acid, by means of a glass pen, to obtain the distinctive colour; the conclusions derived from his own researches were, that strychnine is not decomposed in the body, and can always be discovered if a proper method of analysis is employed. Should any Member of the Society wish to repeat the author's experiments, he would be happy to show him the methods of analysis adopted by himself and Mr. Girdwood, and he was perfectly certain that strychnine would be readily found.

Mr. **Bastick** thought that Dr. De Vry's question had not been answered by the two last speakers, namely, can strychnine be detected in the urine of a patient who does not die from its effects?

Mr. **Rodgers** said he had detected it in such cases.

Mr. **Redwood** thought it of the highest importance, if Dr. De Vry's conclusions were erroneous, that they should be corrected as early as possible. He concurred with Mr. Rodgers in thinking that the method described in Dr. De Vry's paper for applying the test for strychnine was not the most delicate method. He had found a solution consisting of one grain of chromic acid in 500 grains of oil of vitriol, the best form in which to apply the test where the quantities of strychnia to be detected were very minute. Failure often arose from the use of too much of the oxidizing agent, in which case the effect was so rapid, that the eye failed to follow it.

THE SESQUIOXIDE OF IRON USED IN MEDICINE.

Mr. **Allchin** brought this subject under the notice of the Meeting. He laid two samples of sesquioxide of iron on the table, one of which was made strictly according to the Pharmacopœia, and this was a hydrated oxide, but was of a dull or rather dirty-looking colour; while the other was of a bright colour, and was generally preferred by purchasers on this account, but it differed from the preparation of the Pharmacopœia, inasmuch as it was anhydrous—in fact, the bright colour was given to it by heating it to such an extent as deprived it of its water of hydration. He thought this fact was not sufficiently known or attended to by Pharmaceutists, as it appeared to be the general practice to prefer that oxide of iron which presented the brightest colour, without any reference being made to its state of hydration. The bright-coloured anhydrous oxide differed in composition from the oxide of iron of the Pharmacopœia, and he believed it was much less efficacious, on account of its being much less easily acted upon by weak acids.

Mr. **Redwood** quite agreed with Mr. Allchin that none but the hydrated sesquioxide of iron ought to be used in medicine, as this was the sort ordered in the Pharmacopœia. He thought this a sufficient ground for rejecting the anhydrous oxide, and that it was a safer position to take than that of the superior efficacy of the hydrated oxide.

SWEET SPIRIT OF NITRE FROM METHYLATED SPIRIT.

Mr. Macfarlan submitted to the Meeting a specimen of nitrate of oxide of methyl, and also of sweet spirit of nitre made from methylated spirit. The former of these preparations had been obtained in as pure a state as possible, with the view of ascertaining its medicinal properties. As a portion of this ether was formed in making sweet spirit of nitre from methylated spirit, it was obviously important to ascertain whether it would interfere with the medicinal effects of the nitrous ether. He had made some experiments on this subject, the results of which were published in the last number of the *Pharmaceutical Journal*. There was one peculiar property possessed by the nitrate of oxide of methyl which ought to be generally known. The vapour of this substance, when slightly heated, exploded with considerable violence. This was shown by putting three or four drops of the liquid into a test-tube, and heating it over the flame of a lamp. He had been for some time directing his attention to the manufacture of sweet spirit of nitre from methylated spirit, and the sample which he now submitted to the meeting would, he thought, be found free from disagreeable flavour. He hoped, however, to improve even upon this.

Mr. Redwood wished to say a few words on this subject, as his name was frequently referred to in connexion with it, and his opinions had been to some extent misunderstood. Much as he approved of the general measure which had been adopted by the Government for allowing the use of spirit free from duty for manufacturing purposes, he did not think the Board of Excise had acted wisely in sanctioning the manufacture of sweet spirit of nitre from methylated spirit. The opinion he had originally formed on directing his attention to the subject, had undergone no change, and the other Commissioners, as well as himself, had strongly urged on the Board of Inland Revenue, that the effect of allowing sweet spirit of nitre to be made from methylated spirit would be either to inflict a serious injury upon the practice of medicine, by deteriorating the quality of a useful medicinal agent, or to imperil the permanence of the general measure, by rendering it unsafe to the public revenue. The first effect of the introduction of this new branch of manufacture had been that large quantities of methylated sweet spirit of nitre had been sent all through the country, which was wholly unfit for use in medicine—thus realizing the first anticipated effect. But now they were told by the manufacturers that the difficulty of purifying the product had been overcome, and that sweet spirit of nitre free from disagreeable flavour could be obtained from methylated spirit. If this proved to be correct, it would certainly realize the second anticipated result, for there was no difficulty in recovering good, pure, and drinkable spirit, from good and pure sweet spirit of nitre. When, therefore, the manufacturers succeeded in making good sweet spirit of nitre, such as was fit for use in medicine, from methylated spirit, it would of course be soon applied to other than medicinal purposes.

Mr. Macfarlan said that Mr. Redwood had evinced much interest in support of the public revenue, which was quite uncalled for, as he might safely leave that to the excisemen. He (Mr. M.) thought the measure introduced by the Government would have been very imperfect if it did not enable the manufacturer to make sweet spirit of nitre from spirit free from duty. One of the objects of the measure had been to put a stop to illicit distillation, but as much of the illicit spirit produced had always been converted into sweet spirit of nitre, the practice could not be entirely stopped until this resource of the illicit distiller was taken away from him. He had every reason to believe that the Board of Inland Revenue were quite capable of taking care of their own interests, and that they were adopting a safe and a wise course in sanctioning the manufacture of sweet spirit of nitre from methylated spirit.

Mr. Bell certainly thought Mr. Macfarlan had attempted to prove too much. He understood the question originally submitted to the Chemists by the Board of Inland Revenue to have been,—Can you add something to spirit of wine which will not interfere with the use of the spirit for a variety of manufacturing purposes, but which at the same time will prevent its being used as a beverage, and which will be so firmly retained by the spirit that it cannot be removed? The Chemists announced that they had found such a substance in wood naphtha, and accordingly the plan of "methylating" spirit was adopted as an effectual disguise, capable of resisting all efforts at removal. Now, he understood Mr. Macfarlan to have announced that evening that he had succeeded in removing all trace of the contamination—that is, in washing the blackamoor white. He (Mr. Bell) thought this an unfortunate result; which, if it should prove true, would be fatal to the permanence of the measure which had been hailed as a boon to English manufacturers; it would prove that, by grasping at too much, they were liable to lose all those benefits which could be safely enjoyed, such as the application of the methylated spirit for the manufacture of varnishes, alkaloids, and other chemicals.

PHYTOLOGICAL CLUB.

17, *Bloomsbury Square, February* 11*th*, 1857.

R. BENTLEY, F.L.S., PRESIDENT, IN THE CHAIR.

Donations were announced from Mr. Fewtrell and Mr. Blyth.

The following paper was then read, and illustrated by microscopes and a great variety of specimens :—

ON THE MICROSCOPICAL EXAMINATION OF SOME TISSUE FOUND IN COAL.

BY MR. J. T. TUPHOLME.

The object of this paper is to bring before you some observations as to the probability of our coal beds being partly formed of other exogenous trees than the *Coniferæ*.

In January, 1854, on examining some specimens of ordinary household coal, by making fine sections with a scalpel and razor, I was pleased to find numerous portions of vascular tissue well preserved, and showing the bothrenchyma or pitted tissue. This was plentifully shown in every piece of the coal I then examined, which I believe was Clay Cross, but am not certain. Specimens and sections of it are upon the table.

Specimens are also on the table of *Cannel*, *Silkstone*, and *Rothwell Haigh*, none of which afford any recognizable structure, though evidently of vegetable origin, by its fibrous appearance.

Stewart's Wallsend I had examined, and placed as not yielding it; but on heating a piece, and breaking it by a blow, I found it contained the same structure. So I think in some cases I ought rather to ascribe it to cursory or incomplete examination when this structure is not found, than to its actual absence. I was successful also in finding it in a Derbyshire coal, the *Pinxton Wallsend*, from a colliery near Alfreton—some pieces showing scalariform tissue, as well as the bothrenchyma. In one specimen there is the oblique junction of two vessels displayed. The only tissue this might be confounded with, I think, would be the punctated tissue of some of the araucarias, where the disks are very small. But I have observed, on turning some of this porous tissue under the microscope, by floating it on water, that it shows a single row of pores; while on turning on its edge, it is barely visible, being so extremely thin—a mere line. Now this would not be the case with punctated tissue. I therefore consider it as one side of a pitted vessel. Botanists have given the opinion of coal being the produce of pine forests and ferns, with numerous plants of lower organization, that have undergone immense pressure for many centuries.

Broignarl notices 500 plants of the coal measures. Of these, 6 are Thallogens, 346 Acrogens, 135 Gymnosperms, and 13 doubtful plants.

You will please to notice that nearly all the plants mentioned are Acrogens and Gymnosperms. Now I wish to show that by finding so plentifully the pitted vascular tissue, the great probability, nay even certainty, that Dicotyledonous plants other than the *Coniferæ* have contributed to the formation of some of our coal beds, and in a large proportion; for we do not find the pitted tissue in ferns, and scarcely I am inclined to think in the *Coniferæ*, though it may occur at times, but more the exception than the rule. If we examine a transverse section of Pinus or Araucaria, the woody fibres are all alike in appearance, and the larger tissue of bothrenchyma seldom seen.

Now the bothrenchyma occurs largely in all Dicotyledonous plants, excepting the Gymnosperms, as may be seen by transverse section of the vine, liburnum, or ash. The punctated tissue I have been unable to discover at all in coal, though I have tried several plans. It therefore becomes interesting to consider whether there may not have been, coexistent with the so-called reign of Acrogens and Gymnosperms, other forest trees of exogenous structure, that have contributed to the formation of our coal beds.

Mr. Fewtrell and Mr. Henry Groves have been elected Members of the Club.

The next meeting will be held on Wednesday, March 11th, at half-past eight P.M., when a paper will be read on the subject of coal by Mr. Greenish.

PHARMACEUTICAL SOCIETY,

NORTH BRITISH BRANCH.

A Meeting of the Pharmaceutical Society was held at Edinburgh, in 50, George Street, on Friday evening, 13th February, at nine o'clock,

MR. FLOCKHART, VICE-PRESIDENT, IN THE CHAIR.

Notes of apology were intimated from Mr. Robertson and other Members.

Mr. D. R. Brown read the following communication

ON THE EFFECTS OF SWEET SPIRIT OF NITRE WHEN INHALED.

In the *Edinburgh Medical and Surgical Journal*, vol. xxxv., p. 452, a case of death from breathing the vapour of sweet nitre is quoted from the *Midland Medical and Surgical Reporter*, No. II., and which is also noticed by Professor Christison in his work on poisons. Of that case we only learn that the young woman "was found dead. She lay on her side, with her arms folded, the countenance and posture composed, and the whole appearance that of one in a deep sleep." A jar of sweet nitre kept in her bedroom had broken, and filled the apartment with the vapour. In this case the death of the girl is ascribed to the nitrous ether, but apparently rather from producing asphyxia by the mere negation of atmospheric air, than from any deadly power in the nitrous ether itself; for it is added, "the woman seems to have died as in cases of poisoning with carbonic acid, from slow obstruction of the breathing—from gradual asphyxia." This I believe is the only case upon record. Fortunately the observations now to be brought before you do not reach so far as death, but they reach so far as to make it certain that the vapour of sweet spirit of nitre exerts a power belonging to itself, and of sufficient energy to destroy vitality, when taken into the system through the lungs.

Before entering upon the symptoms to be detailed, it may be mentioned that they manifested themselves in different persons of various ages and habits, and at different times and places, and that their manifestation was most marked during the preparation of pure hyponitrous ether, or after long exposure in a large room to the uncondensed gases evolved in the preparation of the sweet spirit of nitre of the Edinburgh Pharmacopœia; but they have also displayed themselves in a very decided way indeed, from merely breathing the vapour thoughtlessly, while measuring sweet nitre from one jar into another. One of the individuals having been under the influence of the vapours of nitrous ether more frequently than any of the others, I will state first the particulars of his experience. The first observed effect is a bluish-purple colour, which the lips take on. This occurs even when the vapour is very dilute, and it may exist quite unconsciously, and without any bad effect whatever. After being exposed for one or two hours to a rather diluted vapour, or after exposure for only a few seconds to a very partially diluted vapour—after it may be only three or four natural inspirations—the lips assume a deeper purple tint, the eyes a dull appearance, and the whole countenance has a ghastly, dirty-looking pallor about it, as if smoked all over. The hands, more especially beneath the nails, partake of the purple colour. The first felt effect is the loss of muscular power, which goes on until complete prostration ensues. At this period the lips are still purple, the face ghastly, and with the hands of a leaden blue or purple colour. The pulse is weak and quick, the breathing slow and regular, and the extremities cold. The mind is calm, no ways distressed, and as clear and able as at other times; and only a very slight degree of swimming in the head exists, scarcely perceptible even when at the worst. No pain is felt anywhere, and there is no consciousness of muscular debility until an effort is made. Upon walking a short distance, more or less, as the case may be, the breathing becomes very hurried, and the pulse very quick; and if the attempt is persevered in, the heart makes itself felt by its rapid, tremulous, tumultuous action, the breathing becomes quick, difficult, and painful, and a most distressing sense of painful constriction is felt underneath the sternum; the knees shake, and refusing any longer to remain rigid, give way. The mind is as before. Perfect rest, heat, and a warm atmosphere, with brandy and a little ammonia, gradually restore the powers of the muscular system. After five or six hours have elapsed, a dull annoying pain is felt in the head, more acutely along the course of the temporal arteries, which continues for five or six hours. During the night, while in bed, the skin is dry, but by no means hot; yet while there is no restlessness, it is a relief, and pleasant to the feet, to hunt out the coolest spot they can find. Sound sleep follows at, or perhaps a little after the usual hour; and on getting up next morning, all bad symptoms have vanished, save it may be a little debility. The diuretic action of sweet spirit of nitre was not apparent until twelve or fourteen hours after exposure to the vapour.

The second case—a gentleman who also has experienced the effects of the vapour of nitrous ether oftener than once—will be best given in his own words, which I will now read. He says:—

"All the sweet nitre I had taken must have been by inhalation, while engaged in making it. When it began to affect me, it was between seven and eight P.M. I at that time felt headache and slight confusion of ideas, and remember noticing that my nails were coloured blue, and also that Mr. G.'s lips were the same. About half-past eight I proceeded home, at first feeling neither increase nor diminution of the symptoms; but by the time I had reached half a mile, I felt very weak and unable to walk, which at last compelled me to sit down for a little on a stair. I recovered considerably by this, and was able to proceed; but all this time I experienced some mental alarm about my condition, so much so that I went out of my way to call at my brother's, where I got a little brandy. Shortly after, I felt quite strong in the limbs, but the headache was still present; indeed, I may mention that it did not go entirely away till the middle of next day. By the time I got home I again felt the weakness of limbs coming on, but fortunately I was soon in the recumbent posture—so soon that I alarmed my friends by laying myself down the moment I came in. I then asked for more brandy, and also hot water for my feet. I then sat up for nearly an hour, when an exceeding drowsiness came on, quite like what one feels after long hard work; but this perhaps was partly the effect of the brandy. On getting to bed, I slept, and that soundly for nine hours and a half, and on awaking, all the symptoms were gone, except the slight headache."

In this second case, there was giddiness, slight confusion of ideas, continuing all the evening, with some little anxiety; the depression did not go off altogether until twenty-four hours had elapsed; the headache came on about half an hour after exposure, and continued for seventeen hours; and the diuretic effects were produced within an hour or two after the inhalation of the vapour: these constitute the differences between the first and second instance. The only additional symptom which was noticed in the third case was vomiting, which occurred at an early stage, and was not either severe or persistent.

Such, then, are the results of inhaling the vapour of nitrous ether. Doubtless, a very few full inspirations would terminate in death,—brought on, not merely by preventing the access of atmospheric air, but by its own inherent energy.

Among the symptoms, two may be noticed: first, the marked effect produced upon the blood, evidenced by the leaden-purple colour of the lips, mouth, hands, &c.; and second, the extreme muscular debility. Chloroform has been employed to subdue the furious mania of delirium tremens; might not sweet spirit of nitre or the cautious use of hyponitrous ether, be in such and such like cases a better agent? The muscular debility, in my own experience, comes on very rapidly, unaccompanied by the slightest effect on the brain, and it endures for hours. Such was not, however, the experience of others; and the headache which invariably follows its inhalation, either immediately or soon after, may be a contra-indication to its use.

And now a question arises,—Can we account for such symptoms? To the purely medical part of the answer which this question demands, it is not my intention to offer a reply; the *modus operandi* must be left to others better fitted and more entitled to enter upon it. But there lies wrapt up in it, besides its physiological question, another,—namely, its chemical; which, in truth, is not one question, but many questions; which asks,—Do the effects produced by the inhalation of sweet nitre depend upon its chemical composition? Here a wide field opens up to us, upon which at present we can only cast a look; for the same question may, and, we think, will, be put to every substance made use of by inhalation. The experimenters of former days have left us records of the results arising from the inhalation of a few gases, simple and compound,—not very pure, we fear; but inhalation in our own day has taken a rapid stride forward, and experiments upon a number of substances have been made. The experiments of our own day, however, have been made in order to arrive at a practical conclusion—the production of anæsthesia—and not in search of a cause or a philosophical explanation of phenomena. The effects produced have indeed, we believe, been ascribed to carbo-hydrogens, and apparently with some truth; but, most unquestionably, the simple and compound bodies which enter into union with the carbo-hydrogens do also enter into the effects produced by them when inhaled. We find that experiment bears this out: for instance, we may see in Professor Simpson's works, edited by Drs. Priestly and Storrer, that the effects of ether or the oxyde of ethyle ($C_4 H_5 O$) are not the same as the effects produced by the nitrate of oxyde of ethyle ($C_4 H_5 O + NO_5$); neither do these give us the effects which are produced by the hyponitrite ($C_4 H_5 O + NO_3$). I am not aware whether the results of the inhalation of olefiant gas have been made known or not, but it would serve very much towards a right understanding of the action of all the ethyle compounds if they were. Sir H. Davy has left us his experiments on the inhalation of the carbo-hydrogen got by the decomposition of water by charcoal, which he terms hydro-carbonate,—a mixture, perhaps, but likely $C_2 H_2$. We find in all these a family likeness, but yet a very marked difference; pointing, of course, to a difference in the producing cause, which may to some extent be due to the idiosyncrasy of individuals, but not wholly owing to it, inasmuch as the same person is differently affected by the different substances employed. We can scarcely doubt that these differences have their source in the difference of chemical composition. Thus—

Olefiant Gas	$C_4 H_4$
Ether	$C_4 H_5 O$
Alcohol	$C_4 H_5 O + HO$
Hyponitrous Ether	$C_4 H_5 O + NO_3$
Nitric Ether	$C_4 H_5 O + NO_5$

are kindred both in their chemical composition and in their action upon the living system. Formyle ($C_2 H$) has not yet been inhaled and its action noted, but suppose it were, would the effects be the same and no other than those of chloroform, the perchloride of formyle ($C_2 H Cl_3$); would the three atoms of chlorine make no difference? It would be absurd to assert yea or nay, regarding a matter which experiment alone can decide, but all analogy leads us to believe that the chlorine does exert an influence, and that the results of the inhalation of chloroform or any other substance, are either the results of the combined forces of the elements within it, or the sum of their differences. Could we establish such a law, could we discover and control the force, we would then have one element of a true science of medicine, namely, a scientific materia medica and therapeutic. But with regard to a right answer to all such questions, our present experiments are yet in chaos. The time must, however, soon arrive, when such investigations will be entered upon, opening up a new branch of science, and just as Chemists are now able to say how far an atom of carbon or hydrogen, &c., will affect the boiling point of the compound into which it enters, so will they be able to say what effect it will produce upon the living system of man. Nor do we think this when done will exhaust it, for not only do material substances act with energy upon man's material frame, they act also as we all know, upon his mind and emotions. Is it too much to expect that we may also, by means of inhalation, be able to experiment upon and so discover more about the mind and emotions than we do at present? Man has laid the strong hand of his intellect upon the lightning and held it fast while he questioned and compelled an answer, and subdued it to his will. By his subtlety he has untwined the sunbeam and made it tell him of its curious secrets. He has grappled with the strong and woo'd the beautiful, and conquered both. Must mind escape him? Perhaps it must; but it can never be folly to experiment, observe, and tell the truth. Failure in experiment is but finding another truth than that we sought for, and while its lesson is often bitter, it nevertheless teaches confidence in self and humility and forbearance towards others; while not seldom it is that the truth found is of more value than that we asked after. But we must not wander. It is indeed true that the great majority of simple substances as we find them cannot be inhaled; but in hydrogen, oxygen, and nitrogen, we have three gases which, one or other of them, combine either directly or indirectly with all the others, and bring them within our reach. Is it not in our power to experiment upon these, and by accurate observation and arrangement of the phenomena, secure data for deducing the effects due to other simple or compound bodies when experiments are made with their compounds of hydrogen, oxygen, and nitrogen? We cannot doubt it.

But before we can look intelligently at the effects produced by inhalation, much must be done. Even at the outset, experimenters will find themselves beset with a difficulty not easily got over. They require an arrangement of the phenomena presented to us by inhalation, *i. e.*, a classification involving a nomenclature. Anæsthesia is a very good name, so far as it goes; and anæsthetics very applicable to substances which bring on anæsthesia. But insensibility to pain is not the only product of their action. It is only one of a number. By what shall we designate the residue? In a scientific examination of the results of inhalation, anæsthesia is but one of many events, each of which demands careful attention, and of which many can and do happen without anæsthesia. Who will venture the dangerous deed of giving names to these?

In the strong hope that the Society will enter upon the field which lies so open before them, and which promises results so interesting, I will now bring these crude observations to an end.

The CHAIRMAN submitted a specimen of Amelyne to the meeting, and some discussion took place regarding the best mode of manufacturing this new compound.

Mr. MACKAY introduced a new mode of distinguishing bottles containing poisonous simples and compounds, which had for some time been practised by Mr. Hardie, Pharmaceutical Chemist, Dundee. The plan was very simple and efficacious. It consists of using an Indian-rubber ring of a size corresponding to the circumference of the bottle intended to be marked. On the ring a knot is tied, leaving one end longer than the other, and thus giving at once a large and a small loop. The whole being elastic, the larger extremity is placed over the neck of the bottle and the smaller one drawn over the stopper, which is thus kept in its place. Preparations of opium, aconite, strychnia, arsenic, hydrocyanic acid, &c., being thus distinguished, Mr. Hardie thinks prevents the probability of such a bottle as the laudanum being mistaken (as has been done) for the tincture of rhubarb, because the fact of the stopper being secured would cause any dispenser to consider that, before he undid the elastic loop, he had a bottle in his hands containing some powerful preparation, and not a simple and comparatively harmless one. The system was so easily worked, that the meeting thought it the best which had yet been proposed, and a vote of thanks was passed to Mr. Hardie.

A specimen of Bdellium, an adulteration of myrrh, was laid on the table, having been presented to the museum by Professor Christison.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Thursday, 29th January, 1857.

THE PRESIDENT, MR. ABRAHAM, IN THE CHAIR.

Mr. Blanchard was elected a Member of the Society.

The Secretary announced donations to the Museum from Messrs. Warrick Brothers, J. H. and S. Johnson, W. Rawle, Evans, Sons, and Co., and N. Mercer.

Mr. W. H. Samuel read a paper on

CRYSTALLIZATION,

in which, after referring to the influence of cohesive attraction in the formation of crystals, he illustrated the different systems under which crystalline forms are generally arranged, and described the theories of Newton and Haüy. He dwelt at some length on the practical processes for obtaining fine crystals; and the points on which he placed the greatest stress were, the prevention of the formation of a crust at the bottom of the vessel, the advantage of rough-bottomed porcelain or glass dishes, and the avoidance of all vibratory or tremulous motion. In the presence of the last, a confused mass of very small crystals is obtained, instead of large and perfect ones. He had found in practice that the best way of obtaining large and perfect crystals was to suspend a small perfect crystal near the bottom of a solution of the required strength, a portion of the salt being suspended at the top, so as to preserve uniformity of density in the liquid.

The paper was illustrated by diagrams and a number of fine and carefully prepared crystals.

Mr. Mercer brought before the meeting the following analysis he had made of Locust Beans, the ripe legumes of the Ceratonia siliqua, which are at present being brought into this country in large quantities from the Mediterranean, principally from the islands of Malta, Cyprus, and Sicily. A notice of these pods, under the names of Carole Bean or St. John's Bread, is to be found in the *Pharmaceutical Journal*, vol. iii., page 79.

Saccharine Matter	47.5
Albumen	3.25
Mucilage	4.75
Fibrous Matter and Starch	21.5
Ash	2.0
Water and Loss	21.0
	100.00

From the large per-centage of saccharine matter Locust Beans contain, it is very probable they will come into extensive use as an article of food for the fattening of cattle, pigs, &c. Their present price is about £9 per ton.

Thursday, 12th February, 1857.

THE PRESIDENT, MR. ABRAHAM, IN THE CHAIR.

Messrs. T. Greenwood, J. W. Jones, and W. H. Edwards were elected Members of the Society.

The subject of the Sale of Poisons was introduced by the President, and an interesting discussion ensued, in which Mr. Macfarlan of Edinburgh, Dr. Edwards, and several other gentlemen joined.

Mr. T. C. Archer read a paper, of which the following is a short abstract, on

THE USEFUL PRODUCTS OF THE NATURAL ORDER LEGUMINOSÆ.

He arranged his subjects under the three sub-orders, Papilionaceæ, Cæsalpinieæ, and Mimoseæ.

1. The Papilionaceæ.—The plants of this group are generally, though not always wholesome, many yielding a sweet herbage for cattle, such as the vetch, lucerne, and the clovers. But the chief value of the Papilionaceæ is found in their seeds, which are generally highly nutritive, owing to the large quantity of gluten they contain relatively to the other constituents.

The typical character of the fruit of the Leguminosæ is a hollow legume, regularly dehiscing by its anterior or ventral, and its upper or dorsal sutures. The seeds being attached alternately to the two ridges forming the dorsal suture by small funiculi or umbilical cords; but there exist many very wide deviations from this normal type—thus, some are indehiscent, others dehiscent by one valve only, some are single-seeded, and others have the seeds enveloped in pulp, and separated in a few instances by partitions, which are false dissepiments. The last deviation gives rise to the few instances in which the fruit itself is used, excepting in the case of some culinary vegetables. Thus, the pulpy fruit of the tamarind, Tamarindus Indica, L., St. John's bread, or locust, Ceratonia siliqua; the Brazilian locust-fruit (Hymenæa Courbaril), Cassia-fistula, Carthartocarpus fistula, several of the Ingas, and others; but they do not belong to the Papilionaceæ, and will be mentioned in their proper places under the other sub-orders. The legumes of the true Papilionaceæ approximate most closely to the typical form, and from them we obtain most of the seeds remarkable for their farinaceous qualities.

The pea, bean, and lentil are the products of this sub-order. The Egyptian lentil, which is occasionally imported into Liverpool, is perhaps the oldest of the leguminous food products; for it is mentioned in the Bible that the food for which Esau sold his birthright, was partly of lentils. The much-puffed Revalenta Arabica is nothing more than the meal of lentils, which have had their brown skins removed before grinding.

The roots of some of the Papilionaceæ are of much value. Thus, those of Orobus tuberosus are occasionally eaten in the Highlands and in Holland. The woody roots of the Liquorice plant, Glycyrrhiza glabra, are well known for their peculiar sweetness; it is often cultivated in this country.

Many others of the Papilionaceæ yield useful products of various kinds. Thus, several species of Indigofera, and probably many other plants, yield the valuable indigo of the dyers, and Pterocarpus santalinus of India yields another valuable dyeing material—the red Saunders wood of commerce. The valuable gum tragacanth oozes from cracks in the bark of the small shrub Astragalus vera and other species. The medicinal astringent gum kino is obtained from the twigs of Butea frondosa, a beautiful Indian tree, the flowers of which are used under various names as a useful yellow dye in the East Indies. They have been imported under the names of Tisso and Kessaree flowers.

Laburnum is the cytisus of the ancients, and still occupies an important place amongst the hard woods used for inlaying.

A peculiar odorous principle is found in several plants of this division; it is closely allied to benzoic acid, and is found largely developed in the tonquin or tonka-bean, and less so in the flowers of several species of Melilotus. It is in consequence of the presence of this principle called *Coumarine*, in the seeds and flowers of Melilotus officinalis (Wild.), that they are mixed with the celebrated Gruyere cheese to give it its peculiar flavour.

2. Cæsalpineiæ.—The products of this division are chiefly medicinal or dyeing materials. Those of importance as furnishing materia medica products, are the sennas of the East Indies and Egypt, Cassia officinalis, C. acutifolia, C. obovata, C. elongata, C. Æthiopica, and some others. The Cassia fistula, Cathartocarpus fistula (Persoon), is valued for its sweet aperient pulp, and Cassia Brasiliensis is sometimes employed in the same way. The tamarind, Tamarindus Indica, is well known for its useful sub-acid pulp. The dry velvet tamarinds of Sierra Leone, which are eaten under the name of tamarinds, are not used medicinally, but as agreeable fruit. They are produced by two species of Codarium—C. acutifolium (Afzelius), and C. obtusifolium (Afz.) both natives of Sierra Leone. These curious fruits are remarkable for the close velvet-like pile formed by the hairs which clothe the legumes, whence the generic name is derived (Kodion, the hide of a beast). Several of the Cæsalpinieæ yield medicinal balsams, others yield resins, Brazilian copal is produced by the Brazilian locust-tree, Hymenæa Courbaril. A few valuable tanning materials, such as Divi-divi, Algarobilla, and Pi-pi, are found in this group.

3. Mimoseæ.—Gums and astringent materials for tanners are the principal products of this sub-order. Acacia catechu yields those extracts which, under the names of Cutch, Terra japonica, Gambir, and Catechu, are so largely imported from India for tanning purposes. The pods of Acacia nilotica, under the name of Neb-neb or Bablah, have been imported and used both in tanning and dyeing. Many of the acacias yield valuable timber, and one, the Acacia Farnesiana, yields by distillation from its flowers one of the most exquisite perfumes in existence.

Mr. Archer illustrated his remarks with specimens of most of the articles referred to.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The usual monthly meeting of the Society was held in the Royal Institution, Mosley Street, on Thursday, February 5th,

MR. LYNCH, PRESIDENT, IN THE CHAIR.

Mr. Woolley brought before the meeting a collection of specimens of drugs and other natural products of India, selected from those sent by the East India Company to the Exhibition at the Manchester Mechanics' Institution, and which he thought might be interesting to the Members.

Many of the specimens were quite new to the Members, and were examined with much interest. Amongst them were seeds of the bixa orellana, butea gum, almonds in the shell from Malabar, with oil expressed therefrom, which was so pale as to be almost colourless; the fruit of the star anise, the source of the greater part of the oil of aniseed of commerce; wild nutmegs, possessing a peculiar agreeable flavour, not nearly so strong as the ordinary nutmeg, and much resembling that of the sassafras nut; a particularly fine specimen of dragon's blood, which appeared to consist almost entirely of resin; some very fine sandal wood oil; roonduh oil, an odorous oil much resembling the rose geranium, and probably the produce of some odoriferous grass; croton oil, which by the cold had become quite solid and nearly white; sesame and other oils, of which it appears that an almost unlimited supply could be furnished; lac dye, and several specimens of resins and gum resins, and other substances, many of which might probably be useful in the arts were their properties better known than at present, the name in several instances being all the information we possess respecting them.

A vote of thanks was passed to Mr. Woolley for having procured such an interesting collection; and the next meeting was announced for Thursday, March 5th, at 7 P.M.

ORIGINAL AND EXTRACTED ARTICLES.

ON STORAX.

BY DANIEL HANBURY.

(*Continued from page* 423.)

Having in a former number brought under review the various opinions current as to the origin of *Liquid Storax*, and stated the points on which I consider them erroneous, I will now proceed to communicate the information which I have myself received regarding the drug from three valued correspondents in the Levant, namely, Sidney H. Maltass Esq. of Smyrna, Lieut. Robert Campbell, R.N., H.B.M. Consul in the Island of Rhodes, and Dr. James McCraith of Smyrna.

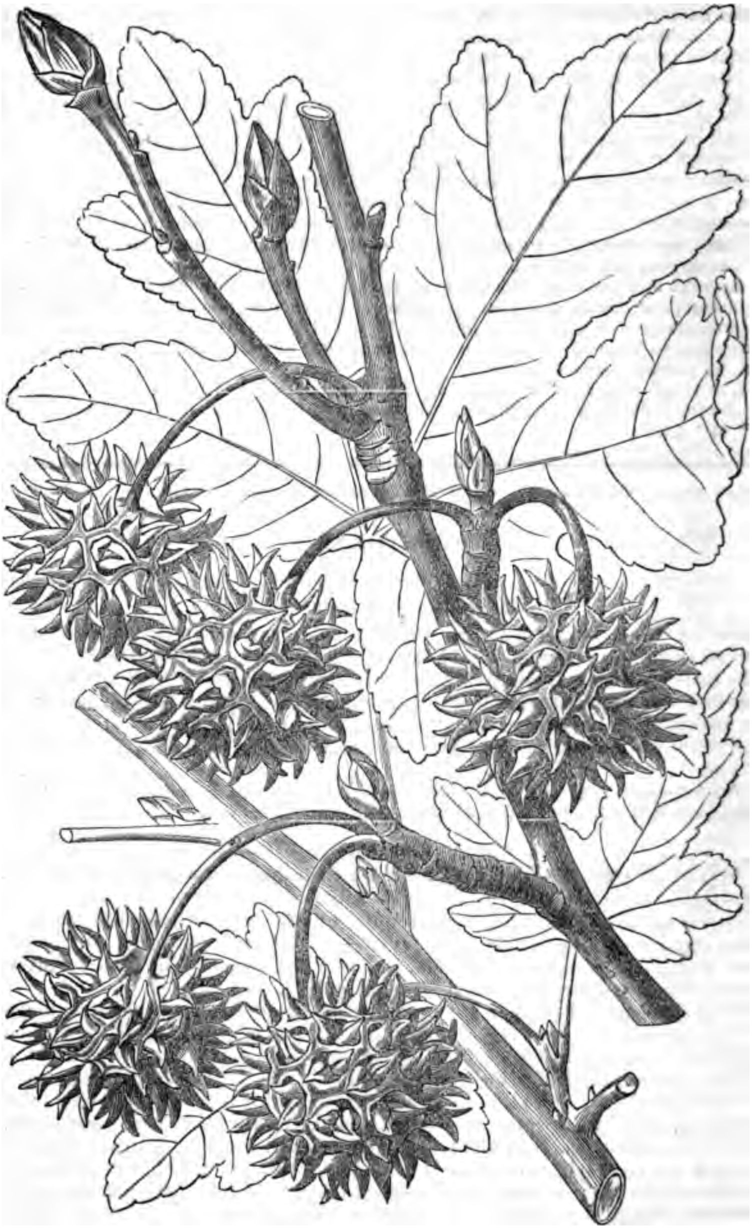
The information is still not quite perfect, but in all essential particulars, I believe the following is a correct account of the

PREPARATION OF LIQUID STORAX.

Botanical Origin.—The tree from which Liquid Storax is obtained, is *Liquidambar orientale* Miller (*L. imberbe* Aiton), as is proved by specimens of the leaves and fruits procured at my request by Mr. Maltass (see wood-cut).

Localities.—South-west of Asia Minor.—Forests in the district of Sighala near Melasso; forests near Moughla, and near Giova and Ullà in the Gulf of Giova; also near Marmorizza and Isgengak opposite Rhodes.

Mr. Maltass passed through a dense forest of *Liquidambar* between the village of Caponisi and the town of Moughla on the 7th or 8th of May, 1851: he describes it as consisting of trees resembling the plane, but evidently of a different species, the leaf being smaller, and each tree far denser in foliage than the plane usually is. "I also observed" says he "that most of the larger trees had the [outer] bark stripped off from the trunk and the inner bark scraped off. I gathered some of the fruit and leaves, and proceeded on my journey towards Moughla, my road lying for upwards of an hour through this beautiful forest. I observed that the trees were from twenty to thirty feet in height, but whenever there was a break in the forest and the trees had sufficient air and space, they were of larger growth, many of them being forty feet high, more especially in the immediate vicinity of streams of water. My guide assured me that in some places in the forest in the direction of Melasso, he had seen some of these trees



LIQUIDAMBAR ORIENTALE, MILL.

From a specimen obtained by S. H. Maltass, Esq., from the coast of Asia Minor, opposite Rhodes.

Fitch, *del.*

sixty feet in height. He could not tell me the name of the tree, but stated that an oil was produced from it called *Buchur*, and that the trees were mutilated to obtain it."

Extraction of the Liquid Storax.—In June and July, the outer bark is stripped off on one side of the tree and (according to Lieut. Campbell) made into bundles and reserved for the purpose of fumigation. The inner bark is then scraped off with a semi-circular or sickle-shaped knife and thrown into pits until a sufficient quantity has been collected. Mr. Maltass states that it is then packed into strong horse-hair bags and subjected to pressure in a wooden lever press. Upon removal from the press, hot water is thrown over the bags and they are pressed a second time, after which the greater portion of the resin will have been extracted.

Lieut. Campbell's account is a little different: he says the inner bark is boiled in water over a brisk fire, upon which the resinous part comes to the surface and is skimmed off. The boiled bark is next put into hair sacks and pressed, boiling water being added to assist in the extraction of the resin, or, as it is termed, *yagh* (i. e. *oil*).

Dr. McCraith says that the Storax collectors, who are chiefly a tribe of wandering Turcomans called *Yuruks*, are armed with a triangular iron scraper with which they scrape off, together with the juice of the tree, a certain quantity of bark, which they collect in leathern pouches suspended to their belts. When a sufficient quantity has been obtained, it is boiled in a large copper and the separated liquid resin is run into barrels. The residual bark is placed in hair-cloth and pressed in a rude press, the extracted resin being added to the general mass.

The product obtained by the processes here described, is the grey, opaque, semi-fluid resin, well known as *Liquid Storax*.

The bark from which the *Liquid Storax* has been extracted, is emptied out of the bags and exposed in the sun to dry, after which it is shipped to the Greek and Turkish islands and to many towns in Turkey, where it is much esteemed for the purpose of fumigation, although since the disappearance of the plague, its employment has greatly diminished.

This is the substance known to pharmacologists as *Cortex Thymiamatis* or *Storax Bark*, as is proved by abundant specimens sent me by Mr. Maltass.

Adulteration.—Mr. Maltass says that Liquid Storax is rarely pure, being adulterated by the admixture of sand and ashes.

Commerce.—Lieut. Campbell states that the quantity of Liquid Storax annually extracted, amounts to about 20,000 *okes* (500 cwt.) from the districts of Giova and Ullà; and 13,000 *okes* (325 cwt.) from those of Marmorizza and Isgengak.[*]

It is exported in casks to Constantinople, Smyrna, Syra and Alexandria. Some is also packed with a certain proportion of water in goat-skins and sent, either by boats or overland to Smyrna, where it is transferred to casks and shipped mostly to Trieste.

It appears from Mr. Maltass, that formerly the whole, both of the resin and the residual bark, was bought by the merchants of the island of Rhodes, but at what period and under what circumstances this occurred, I have not been able to learn.[†]

Though I have no pretensions to be an Oriental scholar, I may be allowed to offer a few words respecting some of the eastern names of *Liquid Storax* and the bark which remains after its extraction.*

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[*] In English commerce, 40 *okes* are reckoned as equal to one hundredweight.

[†] Dr. Landerer's account appears to have reference to this period: and even his statement of the *cultivation* of the Storax plant (whatever plant is intended) has some support from the following passage in Duhamel's *Traité des Arbres* T. ij. p. 288.

"Au Levant on cultive aux environs de Stanchir [Cos], les arbres qui donnent le Storax, et on les multiplie par marcottes." Dr. Landerer's βουχοῦρι, it will also be observed, is traceable in the Turkish name *bukhur*.

Liquid Storax is known to the Turks by the name قره كونلك ياغى *Kara ghyunluk yaghy*, i. e. *Black Frankincense Oil*.† It is also called بخور ياغى *Bukhur yaghy*, i. e. *Incense Oil* and sometimes (according to Mr. Maltass) سغاله ياغى *Sighala yaghy*, i. e. *Sighala Oil* from the district between Melasso and Macri where much of it is collected.

The Greeks designate it Στύραξ ὑγρὰ, but often use the Turkish name *Bukhur yaghy*.

In a *Report of the External Commerce of Bombay* to which my attention was directed by my friend Dr. Royle, the term *Rose Malloes* is applied to a drug enumerated under the category of *Imports by Sea into the Port of Bombay*.‡

The recurrence of this strange name which Petiver's account of *Liquid Storax* had made familiar, struck me as very curious, and I wrote to Bombay for a sample of the drug so called. This was kindly procured for me at the Bombay Custom House by Dr. Carter, and proved to be our ordinary *Liquid Storax*. It is imported chiefly from the Red Sea, which it doubtless reaches from Alexandria, to which port I found it was shipped from Rhodes. Here then is the explanation of Petiver's statement of the drug being carried *southward* from Suez,—it being in fact, on its way to India.

His term *Cotter Mija* is the Arabic قطر ميعة *Katr may'a*, ميعة *may'a* being one of the Avicennian terms for Storax, and قطر *katr* (literally *a drop*), a prefix indicating its liquid nature.§

The only other author with whom I am acquainted that alludes to *Rosa Mallas* is Garcia,‖ who, when describing the various sorts of Benzoin, mentions "*Roça-malha*," which he asserts is the name applied by the Chinese to *Liquid Storax*.

Whether it is the resin of the *Rasamāla* (*Liquidambar altingiana* Bl.) that is here intended, and whether the *Rosa Mallas* of Petiver and the *Rose Malloes* of the Bombay List are but corruptions of the same term applied to a different substance, are points which I shall not attempt to decide.

The residual bark after the extraction of the *Liquid Storax*, is known to pharmacologists as *Cortex Thymiamatis*, *Cortex Thuris*, *Thus Judæorum*,

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* I will here acknowledge the assistance kindly afforded me by Dr. Greenhill, the translator of Rhazes, on the subject of Arabic names; and also that of J. W. Redhouse Esq. with regard to Turkish names.

† *Olibanum* is called in Turkish كونلك *ghyunluk*.

‡ The following is an extract from the Report referred to :—

"Rose Malloes."	cwt.	qr.	lb.			
"From Aden	5	0	0	value	186	rupees
" Arabian Gulf	41	0	0	"	1574	"
" Persian Gulf	12	0	0	"	480	"
Total.........	58	0	0		2240	rupees."

§ Lib. II. cap. 623. (ed. Venet. 1564).—It can scarcely be doubted, that in this chapter on "*Miha vel Meha*" which the translators have rendered *Storax*, Avicenna refers to the modern *Liquid Storax*. The passage is as follows :

"* * Storax humida alia est, quæ extrahitur per se ipsam gumma : et alia est quæ extrahitur cum decoctione: per se autem extracta, est citrina, et quando antiquatur, declinat ad aureum colorem, et est [preciosa et grata] : sed quæ extrahitur ex cortice est nigra : et illud ideo quoniam extrahitur cum decoctione corticis illius arboris, et quod extrahitur, est storax hum ida : et quod remanet sicut fæx et vinacia, est sicca."

‖ *Aromatum et simplicium aliquot medicamentorum apud Indos nascentium Historia*. Antv. 1574.

Narcaphthum, *Storax Bark* or *Red Storax*,[*] and is called in Turkish قره كونلك يپراق *Kara ghyunluk yaprak* or more correctly قره كونلك يپراغى *Kara ghyunluk yapraghi*, literally *Black Frankincense Leaf.*

In modern Greek it is known by the simple name of Στύραξ.

The name Θυμίαμα (Incense) does not appear to have any special application to Liquidambar Bark.

Belon has asserted that this bark is called *Maurocapno*[†] and authors have quoted the name on his authority. I cannot but think this an error; Μαυρο καπνὸ signifies literally *Black Smoke*, and in modern Greek it is used by metonymy for *Black Tobacco.* It does not appear to be now applied to the Liquidambar bark.

The name Νάσκαφθον or Νάρκαφθον used by Dioscorides to designate a certain odoriferous bark from India,[‡] has been thought by many authors to have reference to the modern *Cortex Thymiamatis.* But if the latter were collected in the days of Dioscorides, that author, a native of Asia Minor, could scarcely have been so ignorant of the locality of its production, as to have regarded it as an *Indian* drug. Moreover, neither the names Νάσκαφθον nor Νάρκαφθον (nor Λάκαφθον used by Paulus Æginceta[§] perhaps for the same substance) are known in modern Greek. I confess therefore I do not see evidence for identifying the Dioscoridean drug with the product of *Liquidambar.*

The conclusions to which this long investigation leads, may be thus briefly summed up.

1. That the original and classical Storax was produced by *Styrax officinale* Linn.
2. That always scarce and valuable, it has in modern times wholly disappeared from commerce.
3. That the accounts of the collection of *Liquid Storax* given by Petiver and Landerer are in many important particulars grossly erroneous.
4. That *Liquid Storax* is the produce of *Liquidambar orientale* Miller, and that it is collected in the south-west of Asia Minor.
5. That the bark of *Liquidambar orientale* Miller, after *Liquid Storax* has been expressed from it, constitutes the *Cortex Thymiamatis* of Europe.
6. That there is no evidence of the Νάσκαφθον of Dioscorides being the bark of *Liquidambar orientale.*

In a future communication, I propose to offer some account of the manner of preparing the drug now found in the shops as *Styrax calamita.*

ON THE AMOMA OF WESTERN AFRICA.

BY W. F. DANIELL, M.D., F.L.S.,
Honorary Member of the Pharmaceutical Society.

(*Continued from vol.* xiv., *page* 363.)

II. MALLAGUETTA DUBIA.

(*Scapi bi vel pluri-flori.*)

THE species of *Amomum* comprehended under the term of *Mallaguetta dubia* are seldom used by the negro communities for culinary purposes. They are very abundant in several of the inland and maritime regions of intertropical

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[*] Amygdaloid Storax is also sometimes called *Red Storax.*

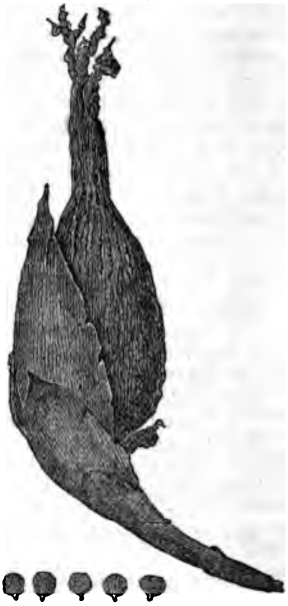
[†] "Je vei aussi descharger vn brigantin dessus la riue du port [de Rhodes], plein d'vne drogue propre en medecine, appellée Storax rouge. Les Grecs la nomment maintenant *Maurocapno.* Et m'a lon dit qu'il croist en l'isle."—Belon, *Observations de plvsievrs Singvlaritez* &c. (1554) liv. 2. chap. 14.

[‡] Νάσκαφθον, οἱ δὲ νάρκαφθον, καὶ τοῦτο ἐκ τῆς Ἰνδικῆς κομίζεται· ἔστι δὲ φλοιῶδες, συκαμίνου λεπίσμασιν ἐοικὸς, θυμιώμενον διὰ τὴν εὐωδίαν, καὶ μιγνύμενον τοῖς σκευαστικοῖς θυμιάμασι, ὠφελοῦν καὶ μήτραν ἐστεγνωμένην ὑποθυμιασθέν. Diosc. *de Mat. Med.* ed. Sprengel, Lib. I. c. 22.

[§] Lib. 7. c. 22.

Africa. Although a great number of species exist, not more than six or eight have been described; and of these a few from imperfect delineations, are but little understood. The products of these *Amoma* are less sought after or appreciated by the native populations as articles of commerce, while they are only occasionally employed as remedial agents, when the true Mallaguetta pepper cannot be procured, owing probably to their inferior pungency or medicinal virtues. The growth of all is greatly influenced by local circumstances, for the plant which in propitious situations attains a luxuriant development, becomes more restricted in proportions, in others less favorable, and assumes such deviations of form and structure as to render the determination no easy matter. As I have elsewhere observed, the negroes of Western Africa admit of only one *Amomum* producing the Mallaguetta pepper, viz. *A. Granum Paradisi.* Afz. (*A. Melegueta* Rosc.) The remaining species are indiscriminately classified under some general denomination, to which is attached a specific title, more with reference to their physical properties than economical appliances. In Yorruba they are usually known by the name of *Obro* or *Oburo* (which is also bestowed on some species of *Hedychium*), and in Ebo, by that of *Opplo* or *Opolo*. Among the Foulahs, Soosu's, and other aboriginal races in the vicinity of Sierra Leone, the vernacular appellations partake of a more special character. The general designation employed by the Timneh tribes is *Massa*. Of these *Amoma*, each species possesses certain botanical peculiarities, by which they can be distinguished one from the other, and more particularly from the *A. Granum Paradisi*, Afz. Thus the solitary flower and fruit, the minutely tuberculated and deep red color of the testa, combined with an agreeable aromatic pungency of the seeds of the latter, readily suffice to sever it from the kindred plants grouped together in this division (fig. 1). Botanical notices of the entire or fragmentary portions of the Guinea plants, have emanated from Sims, Smith, Afzelius, Roscoe, Hooker, Hooker fil., and others; yet, notwithstanding their labors, considerable confusion and doubt still prevail respecting the true source and character of several of these scitamineous productions.

FIG. 1.



Amomum Granum Paradisi. Afz.
(Fruit and seeds.)

1. Amomum *Excapum*, Sims. Fig. 2.

(*The Black Amomum.*)

A. Excapum. *Sims. Ann. Bot., v. 1, p.* 548, *t.* 13.
A. Grandiflorum. *Smith, Exot. Flora, v.* 1, *t.* 111, *et Rees' Cyclo., v.* 39, *addenda.*
A. Afzelii? *Roscoe, in Linn. Trans., v.* 8, *p.* 354.
A. Afzelii. *Smith, Rees' Cycl., v.* 39. *Addenda.*
A. Granum Paradisi. *Hooker, Bot. Mag., t.* 4603.
A. Granum Paradisi. *Hooker fil., in Journ. Bot., v.* vi., *p.* 295.

Foliis elliptico-lanceolatis acuminatis, ligula obtusa v. biloba, scapo multifloro, bracteis laxe imbricatis puberulis obtusis mucronatis, perianthio exteriore tubo brevi limbo obtuso, interiore extus puberulo, lobis lateralibus obtusis, dorsali ovato-oblongo obtuso, labello amplo late obovato-rotundato, marginibus undulato-plicatis, filamento basi utrinque processubus 2 subulatis, antheræ apice integro v. bifido lobulis lateralibus patulis subulatis loculis puberulis, staminodiis, linearibus obtusis, ovario pubescente, fructu ampullaceo v. elliptico-ovato v. lanceolato profunde sulcato pubescente, seminibus brunneis subquadrato-rotundatis, testa atro-brunnea nitida.

Pereira, Mat. Med., ed. 3d., *vol.* 2, *p.* 1130, *f.* 234. *Pharm. Journ.*, v. 6, p. 412. *Guibourt, Hist. Nat. des Drogues Simples*, t. 2, p. 221, fig. 122. (?)

Hab. Sierra Leone, *Dr. Daniell.*

Herba 3—5 pedalis. *Folia* 4—8 unc. longa, 1—1¾ lata, basi subacuta, apice attenuato-acuminata, marginibus purpureis, vaginis viridibus purpureisve, ligula ⅛—⅙ unc. longa, obtusa v. biloba. *Scapi* 2—4 unc. longi ascendentes pubescentes. 3—5 flori. *Bracteæ* remotæ, laxe imbricatæ, late oblongæ, apice obtusæ v. bilobæ, post anthesin deciduæ. *Flores* erecti 2—3 unc. longi. *Perianthium* album, extus roseo tinctum labello erecto intus aureo, lobo dorsali lateralibus æquilongo labello breviores. *Filamentum* processubus 2 basi instructa, quarum 2 exteriores minores. *Antheræ* loculi pubescentes, lobo terminali late truncato, lobulo intermedio brevissimo integro v. bifido, lateralibus cornutis. *Fructus* pubescens, atro-purpureus, carnosus, ampullaceus, subcompressus, 9—10 costatus sulcis acutis, costis ½-teretibus 2—3 unc. longus, 1½—2 unc. latus. *Semina* immatura alba, demum brunnea, nitida (*Hook. fil. ubi sup.*).

I have in a previous paper stated the grounds, which induced me to believe that this species did not furnish the true grains of Paradise, and subsequent researches in Western Africa, have conclusively confirmed my views. Pereira and Guibourt are of opinion that the description of the *A. Granum Paradisi* of Linneus, pertained rather to an East Indian than a Guinea species, and in fact the latter authority observes that his plant is merely a simple variety of the *Elettaria Cardamomum*, Mat., which produces the Malabar cardamom.* Under these circumstances I have retained Sims' name in preference to others, in order to avoid ambiguity. In the *Remedia Guineensia*,† owing doubtless to an accidental error, the flowers of this plant (white) have been substituted for those of the *Granum Paradisi*, Afz. (purple and yellow). Hence the chief source of perplexity in the discrimination of these two species.

The *Amomum Excapum* is indigenous to Sierra Leone, to the Timneh, Sherbro, Soosu, Foulah, Kroo, and Yorruba countries, and is more or less dispersed throughout the different regions of Soudan. In favorable localities it grows to the height of eight or ten feet, but on the mountain declivities near Freetown is seldom found beyond six. The stems (which are of a more woody character than other species) with portions of the roots and leaves, are pervaded by a pinkish hue. The flowers appear in October and November, in numerous clusters on a short scape, are of a white color slightly tinged with pink, and exhale during their evolution an exquisite fragrance. The fruit from one and a half to three inches in length, and about three or four inches in circumference, differs widely from all other kinds by its singular color and development. In the early stage, the pericarp acquires a delicate or velvety softness, from a setiform down (more or less apparent on other parts of the plant) and is of a deep purple verging on black, from which peculiarity of hue it has gained the appellation of *Obro-duddu*, or black Obro, in Yorruba. It is the plant alluded to by Afzelius under the name of *Massa amquona*, who states that the leaves and stems are endowed with the finest aroma, both in respect to scent and taste.* As the capsule approaches maturity, it assumes rounder proportions, becomes with the scape more succulent and fleshy, is deeply sulcated by longitudinal furrows varying from eleven to fourteen in number, and the color imperceptibly changed into a reddish-pink (fig. 2). When the fruit ripens, the delicate hairs diminish, while the sheathing bracts of the scape gradually fall off and disappear, leaving the whole in a nude condition. Pereira, on the authority of Smith, has erroneously figured specimens of the young fruit (fig. 254)† as the *A. Granum Paradisi* of Afzelius. The seeds enveloped in a whitish pulp, free from acidity, are numerous, shining as if brightly polished, chesnut or pale brown, of an ovate or spheroidal form, bluntly angular, with a small pale-yellow hilum, and a minute ridge extending down one side, and terminating in a crenulated apex (fig. 3). They are extremely hot, peppery, and camphoraceous, but devoid of that grateful aromatic flavor on which the taste of the true Mallaguetta pepper depends. When chewed in any quantity, they leave a cool sensation on the palate, like some of the oils of mint. Their camphoraceous acridity would materially lead towards their detection, if mixed with similar kinds of seeds. The capsule in the dry state becomes pale or greyish-brown, is curved, more triangular in shape, peaked, coriaceous, and longitudinally striated with minute irregular ridges, from being contracted two-thirds of its original dimensions. As a remedial agent, this *Amomum* is nearly of equal value to the *A. Granum Paradisi.*

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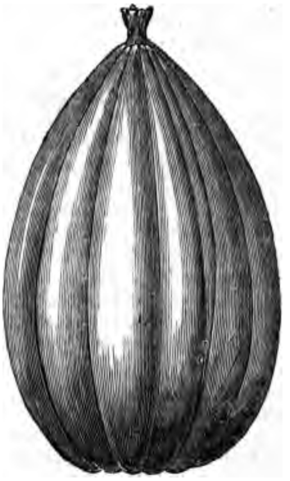
* *Histoire des Drogues, t.* 2, *p.* 220. *Ed. 4th*, 1849.

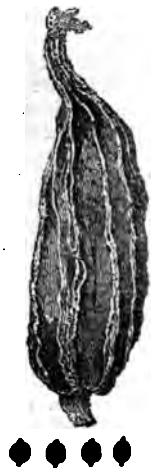
† *No.* X., *p.* 72.

FIG. 2.



Amomum Excapum.
(Fruit, natural size.)

FIG. 3.



A. Excapum.
(Dried capsule with seeds.)

Among the native tribes, every portion of this plant is rendered available for medicinal purposes. A decoction of the roots, leaves, &c., is frequently administered in colic, diarrhœa, dysentery, and other gastro-enteritic affections. The pulverized seeds applied to the temples, constitute a favourite mode of relieving headache and certain forms of ophthalmia. They also contribute towards the composition of various remedial preparations, and the successful cure of several endemic diseases, may be justly ascribed to their efficient action. As a substitute for cardamoms, I have sometimes used them in the military hospital under my charge, as a carminative and stimulant in flatulent colic, dyspepsia, visceral irritations, and as an adjunct with purgatives, and with results uniformly favorable. In the absence of similar kinds of officinal drugs, their administration may be safely recommended, and in many cases will be found to be productive of considerable benefit.

2. Amomum *longiscapum.* Hook. fil. Fig. 4.

(*The long-scaped Amomum.*)

A. longiscapum. *Hook. fil. In Journ. Bot. v.* vi., *p.* 296.

Foliis approximatis lineari-lanceolatis longe acuminatis, basi truncatis, cordato-

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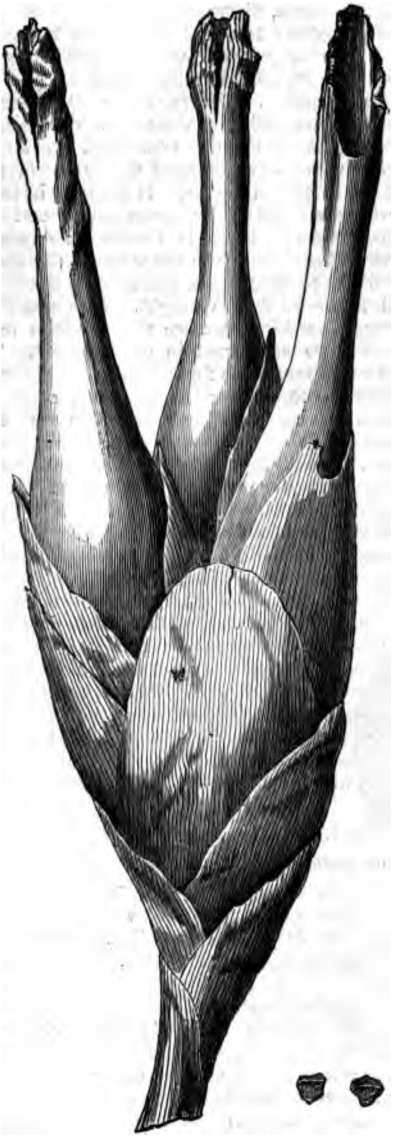
* *Sierra Leone Report, p.* 173.

† *El. Mat. Med., ed.* 3*d.*, *vol.* 2, *p.* 1130.

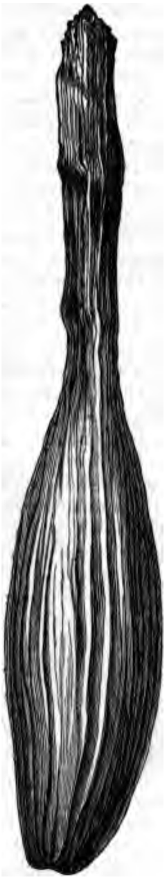
bis, ligula brevissima truncata, scapo elongato erecto, bracteis plurimis ressis sensim longioribus superioribus late oblongis obtusis truncatisve, bus 3—5 terminalibus, calycis tubo elongato apice acuto, perianthii lobis

FIG. 4.



Amomum longiscapum.
(Fruits, natural size.)

FIG. 5.



A. longiscapum.
(Dried capsule with seeds.)

lateralibus e basi lata sensim angustatis dorsali oblongo-obtuso, labelli limbo amplo late obovato rotundato margine undulato-plicato, filimento brevi basi utrinque processubus 2 inæqualibus instructo, antheræ lobo terminali apice rotundato lobulis lateralibus cornutis ascendentibus, staminodiis liberis linearibus, fructu anguste lanceolato compresso trigono, &c.

Hab. Regent, and Sugar-loaf Mountain, Sierra Leone. *Dr. Daniell.*

Herba elata, glaberrima. *Folia* pedalia 2½ unc. lata. *Scapi* 6—10—unciales graciles. *Bracteæ* inferiores parvæ superiores latæ, 2—unciales, purpureo-maculatæ. *Flores* ampli, inodori. *Perianthii* tubus gracilis; labellum purpureum, basi albidum. *Anthera* purpurea. *Fructus* siccus 2½—3 unc. longus (excl. perianth.) ¾ unc. latus, glaber, parietibus ut videtur vix carnosis. *Semina* immatura, valde angulata, arillo papyraceo tecta. (*Hook. fil. ubi sup.*)

This fine *Amomum* appears almost to have escaped the notice of the native Africans, and is but little known in Sierra Leone. It delights in remote and swampy recesses of forests, where concealed by dense brushwood it eludes observation, and cannot easily be obtained; hence in Yorruba the appellation of *Obro-beghar.* This plant may be distinguished from other species by the remarkable long scapes, flowers and fruit, cordate-based leaves and thick and lofty stems, which frequently exceed 10 or 12 feet in height. In Sierra Leone, the wooded ravines beyond the Sugar-loaf Mountain are the localities in which it chiefly abounds, and where it is more exuberant in development. They are, however, difficult of access. The flowers come forth in June and the two succeeding months, but do not expand to the same extent as those of the previous species. The superior portions of the corolla with the labellum are of a moderate purple, which gradually fades towards the base of the perianth. The scape is from 2—4 feet high, branched and severally crowned by two or three fruits, which at first of a pale green are subsequently changed into a ruddy pink. The apices of the capsules with their sheathing bracts, are covered with numerous brown spots or streaks. The capsules are somewhat cone-shaped or oblong, about three or four inches long, with an elongated and infundibuliform apex; convex externally, but flattened and obtusely angular on the inner side, when conjoined with others (fig. 4). If of solitary growth they become rounder. The pericarp is thin, smooth, and shining. The pulp, white, rather dry and dense in substance, is divisible by septa into three longitudinal portions, and affords a delicate saccharine taste. The seeds are of a deep red colour, sharply angular, studded by variable elevations on one side, with a superficial furrow on the other, that descends to a projecting angle or base, on which the small and pale yellow hilum is placed (fig. 5). Their aromatic qualities are extremely weak; they have, however, a peculiar flavor which serves to distinguish them from those of other *Amoma.* The negro populations apparently have no recourse to this plant for any medical or economical appliances.

3. Amomum *latifolium.* Afzelius. Fig. 6.

(*Large or grape-seeded Amomum.*)

A. latifolium. *Afz. in Remedia Guineensia, No.* 1, *p.* 5.

A. Macrospermum. *Smith in Rees' Cycl., v.* 39. *Addenda.*

A. Macrospermum. *Pereira. El. Mat. Med., vol.* ii., *p.* 1139.

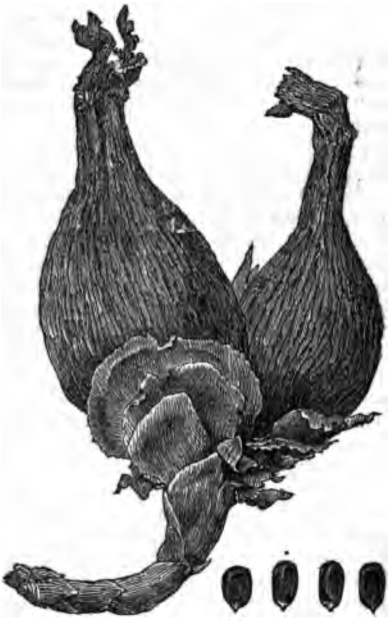
Scapo. subterraneo, floribus aggregatis, fructu ovali arciformi, caule sterili simplici, foliis lato-lanceolaribus.

Timmenensibus. Mabubu, *Susuensibus* Goguoi.

Crescit in declivitatibus sylvosis montium Sierra Leonæ. *Stirps* quod ad omnem sui partem glabra. *Caules* plures tripedales steriles simplices, inferne squamosi, superne foliati. *Folia* petiolis longis vaginantibus prædita, dodrantalia, lato-lanceolaria acuta. *Scapus* sesquipollicaris, subterraneus, squamosus, ex eadem cum caulibus radice repente surgens. *Flores* 3—4 aggregati, in ipsa superficie terræ, conspicui, magni, nivei, squamis cincti spathaceis, externis communibus coreaceis, internis propriis membranaceis. *Fructus* 3—4 pollices longus, ovalis, interno latere ferme planus, externo convexus, castaneus, intus tripartitus, desipimentis membranaceis, e columna media quam junctim constituunt, enatis, et semina deinde cingentibus. *Semina* numerosa, dissepimentorum membranulis non tantum in tria corpora divisa, sed singula etiam quasi sacculo detenta, cum seminibus *Vitis viniferæ* et magnitudine et forma et colore congruentia, &c. (*Afzelius ubi sup.*)

This species commonly grows on the outskirts of thickets, and amid the long grass, on the elevated slopes in the vicinity of Kongo-town and Kissy, Sierra Leone, and consequently has obtained the title of the *grass-field Obro* among the Ako colonists. It is indigenous to the Foulah, Soosu, and Timneh countries, and is scattered throughout the intermediate regions northward as far as the river Gambia, where it abundantly flourishes at Koto and Jesswon, near Cape St. Mary's. By the Yorruba people, the two-fold designations of *Obro-lelah* and *Obro-enlah* have been conferred on it, owing to the extreme hardness and magnitude of the fruit. Among the Timnehs, the vernacular name is *Mabubu* or *Egbubu*, while the Soosu's term it *Goguoi*. Owing to the less sheltered places which it prefers, this plant seldom attains that luxuriant growth common to many other species. Although the fructification is largely developed, this species is somewhat dwarfish in proportions, and scarcely rises beyond five or six feet in altitude. The leaves are sessile, acute at the base, and broadly lanceolate. The flowers are white, with the inferior limb of the labellum and tube of corolla tinged yellow. They evolve a faint aromatic odour. The fruit, though sometimes solitary, is generally produced in pairs, which differ in size, being from three to four inches in length, and one and a half to three inches in breadth. They are roundish, broad-ovate, or flagon shaped; if conjugate, obtusely triangular in form, slightly reduced in size, and almost destitute of bracts in their ripe state, the exterior surface being convex, the interior or base, flat. The capsules while young are green in color, which is ultimately converted into a dull-red, and with the exception of the Akkrah variety of the Mallaguetta pepper, are the largest of all the known *Amoma* of Western Africa. They have very thick and densely indurated walls, and are remarkably coriaceous. During and after their exsiccation, they become much reduced in substance, deeply striated from contraction, and assume more of a pale chesnut or orange-brown hue. The pulp is white, divisible by longitudinal segments into three equal parts, small in comparison with the pericarpal coat; and moderately acidulous. The seeds closely resemble grape-stones, but are larger, more cylindrical, and compressed laterally (fig. 6). They are oblong-obovate, greyish or deep brown, smooth, polished, with a minute raphe extending from their apex to a yellow crenulate, and projecting hilum. Their flavor is feebly aromatic.

FIG. 6.



Amomum latifolium.
(Dried capsules, reduced one-third in size, with seeds.)

There can be little doubt that this is the species on which Smith bestowed the name of *A. Macrospermum*, from the great size of the seeds. Afzelius brought only a solitary fruit, which he gathered near the old graveyard of the settlers, and stated that the natives termed it *Mabubu*. Smith's description of the capsule being ovate, pointed, and somewhat striated, with the seeds obovate, and having a bordered prominent scar, seem to establish their identity. Gærtner's figure of the fruit and seeds of the *Zingiber Meleguetta*, to which he refers, evidently belongs to a different species, probably either the *A. Clusii*, or A. *Danielli*, under the latter of which Dr. Hooker has placed it. The color of the seeds in the African *Amoma*, however, are not constant, nor do they yield a criterion for recognition, since in the young fruits of the *A. latifolium* and other species, they not unfrequently deviate from their normal brown into a lead color. Smith's remark that Gærtner, although he had well noticed their leaden hue, yet had represented them scarcely half large enough, proves that they did not altogether concord. Pereira has incorrectly classed this fruit with the "*Banda cardamom*" of Martius, which widely differs from it, both as regards the shape of the capsule, and in the size, form, and flavor of the seeds. Afzelius remarks that the root and entire plant are employed as medicinal agents by the native populations, principally to remove the debility which follows fevers. With this object they boil the plant with the leaves of the *Morinda citrifolia*, L., and with the decoction wash the body every morning. The acid pulp is also used to relieve the thirst in febrile diseases, or when induced by long journeys.

(*To be continued.*)

ON PEPSINE.

BY W. STEVENS SQUIRE, PH.D.

Some time since a new medicine, under the name of pepsine, was introduced in Paris, and was extensively used there by Dr. Corvisart and others, apparently with considerable success in dyspepsia, apepsia, and certain cases of consumption. This preparation consists principally of a substance well known to Chemists and Physiologists, the nature and composition of which, however, is but imperfectly made out. It is, in fact, to a principle termed pepsine that the gastric juice chiefly owes its property of converting meat and other matters received into the stomach, into a form in which they can be readily assimilated.

By the term gastric juice is understood a fluid secreted by the stomach, and poured into it through a number of minute tubes, situated in the mucous membrane which forms the interior coat. These tubes are, during fasting, plugged up by a mass of epithelial cells; but when the mucous membrane is irritated by food or by certain other stimulants—pepper, for example—the secretion of gastric juice commences, the plugs of epithelium are expelled, and the juice distils into the cavity of the stomach.

Gastric juice contains about 97 per cent. water, 1.25 per cent. pepsine, and 1.75 per cent. salts, consisting of carbonate and phosphate of lime, chloride of sodium, minute traces of sulphates, and sometimes a trace of ammoniacal salts. The proportions, however, in which these inorganic constituents are present, vary considerably. Lastly, the gastric juice contains a free acid, which is one of the most important components.

As it would be impossible to obtain a sufficient quantity of gastric juice for medicinal purposes from living animals, either by fistulous openings or any other method, we seek to intercept the pepsine before it passes into the stomach, and to extract it from the little tubes in which it is secreted, or at all events along which it passes on its way. For this purpose the rennet-bags of sheep are the most convenient, on account of the large supply which is always at hand; and the following process has been proposed by M. Boudault:—The rennet-bags are opened and reversed, and washed under a thin stream of water, to free them from alimentary matters, &c. The mucous membrane is then carefully scraped off with a knife, the cells are bruised in a mortar, and digested for twelve hours in distilled water. The liquid is then filtered, and neutral acetate of lead is rhich precipitates peptate of lead. This precipitate is collected and sed by means of sulphuretted hydrogen, pepsine is thus liberated in and is separated from the insoluble sulphide of lead by filtration. id represents a neutral gastric juice. It is, however, necessary that it e acid, and for this purpose lactic acid is added until the liquid exhibits degree of acidity as a specimen of gastric juice, obtained from the of a dog by means of a fistulous opening. The reason why lactic acid d for this purpose will be shown below. If the artificial gastric juice ined, be evaporated to dryness at a gentle temperature (it should not 00° Fah.), a gummy mass is obtained, which attracts moisture from and is altogether a very unfit article either for sale or administration. to reduce it to powder, M. Boudault simply evaporates his artificial uice to a syrupy consistence, and to this he adds dried starch in such n that one gramme (15 grains) shall be in a position to digest four of dry fibrine, when the two are submitted together in the presence of the temperature of the human body.

ubstance thus produced is a fawn-coloured powder, cohering somewhat , and possessing a peculiar taste and odour. It yields to water the id and the pepsine, producing a solution of a yellowish tint, with the dour, and taste of gastric juice.

ution of pepsine—that is to say, the neutral artificial gastric juice— the following reactions:—Salts of lead and mercury give rise to tes, which, when decomposed by sulphuretted hydrogen, reproduce the with its physiological properties. Tannin likewise precipitates pepsine, precipitate has no power whatever of digesting fibrine. Rectified spirit tes the pepsine from its solution. This precipitate is soluble in water. e alcohol dehydrates pepsine, and destroys, or at all events greatly es its digestive power. One property, however, which pepsine pos- hich is very characteristic, and which is a fruitful source of failure in its tion, is, that at the temperature of about 120° Fah., its solution becomes turbid, and loses entirely its digestive properties.

has been considerable difference of opinion with regard to the nature cid in the natural gastric juice; some Chemists assert, that the acidity is due to hydrochloric acid, some are advocates for phosphoric acid, others r lactic acid, but it is universally admitted that the gastric juice must be produce its physiological effects, and that lactic acid is always present ater or less extent. Lehmann found, that when gastric juice is distilled t portions which passed over were free from hydrochloric acid, but iquid became more concentrated, hydrochloric acid was obtained; and ascribed to the property possessed by concentrated lactic acid of decom- the compounds of the strongest acids, and in this case to the decom- n of the chloride of sodium.

der to determine this question, M. Boudault made the following experi- He first wished to ascertain whether the gastric juice, as it issued from cous membrane, was acid or not. With this view, the rennet-bags were y cleaned and washed as long as any acid reaction was manifested to paper; the cells were then bruised, and treated with cold distilled water; this way a perfectly neutral fluid was obtained. This fluid did *not* possess wer of digesting fibrine at the temperature of the body, but on the n of a little lactic acid a complete digestion was obtained.

it is well known that pepsine has the property of converting glucose or ugar into lactic acid, and when we consider that the saliva can by its convert amylaceous substances into glucose, and that pepsine determines version of glucose into lactic acid, we have a very fair explanation of the of the fluid found in the stomach.

dault found that a mixture of glucose, neutral pepsine, and fibrine, l complete digestion after twelve hours. The process of digestion did not, however, commence until the liquid had assumed a strongly acid reaction. I will not, however, say that lactic acid is the only acid which is capable of playing this part, on the contrary, hydrochloric and acetic acids yield perfect digestions, but not with the same rapidity as lactic acid.

From a number of digestive experiments carefully performed, Boudault found that the pepsine obtained from herbivorous animals is identical in its properties with that obtained from the carnivora, and may be substituted for it, so far at least as the digestive functions are concerned.

The employment of an artificial digestive agent is not new in medicine. The liquid obtained by treating rennet with water, acidified with some acid, has been given with success, but it has never been much used—probably in consequence of the disagreeable nature of the dose; but now that we have the means placed before us in an elegant form, it is no longer a matter of difficulty. The details and the cases where it may be employed will suggest themselves to every medical man. There are at present four preparations of pepsine in use—namely, No. 1, acidified with lactic acid; No. 2, which contains in addition 1 per cent. hydrochlorate of morphia; No. 3, containing ¼ per cent. strychnia; and No. 4, which contains no lactic acid, and is useful where there is an excess of acidity.

Other medicines, however, may be given in conjunction with pepsine, without in any way impairing its action; among these are subnitrate of bismuth, lactate of iron, carbonate of iron, iodide of iron, and reduced iron. Attempts have likewise been made to form a syrup of pepsine, as a more agreeable way of exhibiting this medicine; but it was found that the sugar was after some ten or twelve days converted into glucose, and finally into lactic acid. A solution of pepsine will keep any length of time, provided air be excluded; but, in the presence of air, decomposition soon sets in: and I have found that the best form to keep it in is that of a powder, as originally proposed by M. Boudault. It may be taken in this form very conveniently between two slices of bread, or in the first spoonful of soup, which, however, should not exceed the temperature of the body, the dose being about fifteen grains.

The gastric juice possesses all the characters of a diluted acid; it attacks iron filings, and decomposes the alkaline carbonates, and it appears to me that this fact would justify a much more extended use of the lactates than at present prevails, for such preparations as ferrum radactum, ferri carbonas saccharatum, mistura ferri, &c., must be resolved into lactates soon after they reach the stomach, and that, too, at the expense of one of the most important constituents of the gastric juice.

277, *Oxford Street*, 24*th Feb.*, 1857.

[Mr. Squire has notified, in letters to the *Lancet* and *Medical Gazette*, the existence of a spurious preparation of Pepsine, for distinguishing which he gives the following tests:—

True Pepsine.	Test.	False Pepsine.
Abundant precipitate (Peptate of Lead)	Acetate of Lead	Slight cloudiness.
Abundant precipitate (Tannate of Pepsine)	Tannin	Ditto.
Precipitates the Pepsine	Alcohol	No effect.

The solution of true Pepsine is strongly acid to litmus, whilst the false is only so in a slight degree; but, more than all, M. Boudault's preparation does what it professes to do: fifteen grains digests its drachm of dried fibrin, while the spurious compound is entirely destitute of this property.—*Lancet.*

The most serious contamination of Pepsine is that contained in No. 3, namely, strychnia! For what purpose this is introduced we cannot imagine; but the circumstance of keeping such company is likely to cause alarm, and thus to create a prejudice unfavourable to the general introduction of Pepsine into dyspeptic society.—ED. PHARM. JOURN.]

REPORT OF THE RESULTS OF PHYSICAL AND CHEMICAL INVESTIGATION AND OF THE APPLICATIONS OF PHYSICS AND CHEMISTRY IN THE ARTS.

BY B. H. PAUL, Ph.D., F.C.S.

(*Continued from p.* 432.)

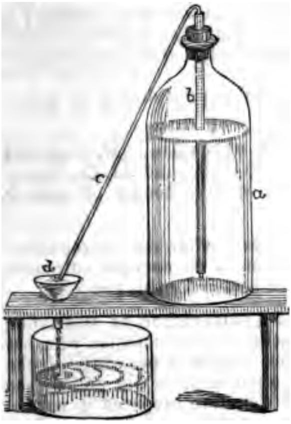
Estimation of Oxide of Lead.—Hr. Vogel states[*] that the precipitate of sulphate of lead produced in solutions containing nitric acid is never free from nitric acid. He recommends that the precipitate should be dried at 212° F., and a portion of it ignited, so as to estimate the loss of weight for the whole by calculation.

When lead is associated with zinc, Hr. Vogel states that the precipitate produced by sulphuretted hydrogen always contains sulphide of zinc.

He also states that lead and zinc do not alloy, the zinc floating at the top of the lead, which contains about 15 per cent. zinc; but that an addition of tin determines the production of an alloy.

Description of a Self-Acting Washing Bottle.—In the *Philosophical Magazine* for August, 1849, a simple apparatus for washing precipitates is described by Mr. Summers, which acts by an adaptation of two concentric tubes to the lower extremity of a washing bottle.

The following apparatus is founded on the same principle; but the concentric tubes being passed through a cork at the top of the reservoir, the instrument is perhaps more convenient for general use.



A wide tube (*b*) is inserted in the cork of a bottle (*a*), so as nearly to touch the bottom. A narrow tube (*c*) is bent into the form of a syphon, the shortest limb of which is a little longer than the wide tube, and the other of such a length that when the short one is perpendicular the two ends of the tube will be on the same level. The end of the longer limb (*d*) is slightly recurved, in order that the water might not disturb the precipitate.

The bottle is now filled with water, the cork fitted tightly in, and it is placed so that the bottom of the wide tube may be below the edge of the filter paper in the funnel. The narrow tube is placed inside the wide one, as in the drawing; then, by blowing down the wide tube, water is forced up through the syphon into the funnel, but will not be able to rise above the level of the bottom of the wide tube, and consequently cannot reach the top of the filter paper.

If, instead of a bottle, a thin glass receiver is used, heat may be applied, and the water in the funnel will be kept warm; but care must be taken not to allow the water to boil, as in that case the water would be forced too fast through the syphon, and might overflow the wide tube, and crack the receiver.

Solubility of Oxalate of Lime in Phosphoric Acid.—Dr. Neubauer finds[†] that oxalate of lime is dissolved by phosphoric acid, and that when the solution is gradually mixed with caustic soda, the precipitate first formed is afterwards redissolved. The liquid deposits oxalate of lime after twenty-four hours.

Organic Acids in Mineral Water.—Prof. Scheerer finds[‡] that the water of the springs at Bruckenau, in Bavaria, contains butyric, propionic, acetic, and formic acids.

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[*] *Neues Repertorium der Pharmacie*, v., 289.

[†] *Annalen der Chemie und Pharmacie*, xcix., 223.

[‡] *Ibid.*, 257.

Detection of Cotton in Woollen Fabrics.—Dr. Overbeck states[*] that when the fabric is three times immersed in a solution of alloxantin in 10 parts water, pressed and dried, then exposed to dry ammonia and washed with water, the wool fibres are dyed carmine colour, while the cotton fibres remain colourless.

Colour-substance of Monarda Didyma.—M. Belhomme states[†] that the flowers of this plant contain the same colour-substance as the fruit of the nopal and cochineal, and that they may be used with advantage for the preparation of carmine.

On Gold in the Form of Malleable Sponge.—Mr. D. Forbes states[‡] that, of late years, gold in a peculiar state of aggregation has been imported from America for the use of the dentists, and sold at prices between from £7 to £8 per ounce. The gold is in the form of flat cakes, about two-tenths of an inch thick, and has a reddish-brown colour and peculiar spongy texture.

By the force of the fingers it can be welded or kneaded into a pellet without crumbling, and becomes by the pressure of a tool nearly as solid as ordinary gold. It is therefore well adapted for dental purposes.

The process by which it is said to be made is patented in America, and consists in repeatedly dissolving, precipitating, amalgamating, heating, &c., so extraordinary that it is probably only put forward to deter others making it. On trial, gold of a similar spongy character was obtained by the following method:—

Gold free from copper is dissolved in nitrohydrochloric acid, keeping an excess of gold in the solution towards the close of the operation, so as to get rid of all nitric acid and avoid subsequent evaporation; any chloride of silver present is filtered off. The solution of gold is now placed in a flat-bottomed vessel and heated, and a strong solution of oxalic acid added; in a few hours the whole gold is deposited, and the supernatant liquid may be decanted off, taking care all the time not to disturb the gold at the bottom, and the vessel is then several times filled up with boiling water and decanted until the last washings contain no more oxalic acid.

The gold is now carefully slipped on to a piece of filtering-paper, and by means of a spatula gently pressed into the form of the desired cake, but somewhat thicker; it is then removed to a porcelain crucible, and heated for a short time somewhat below a red heat, when it shrinks in dimensions, becomes coherent, and is similar to the American product in properties.

As the American gold is of a reddish hue, it is probably precipitated by protosulphate of iron, and not by oxalic acid.

Substitute for Felspar in the Manufacture of Porcelain.—M. Gentele[§] suggests for this purpose the compounds $Al_2 O_3, SiO_2+KO, SiO_2$ and $Al_2 O_3, SiO_2+NaO, SiO_2$, which may be prepared by igniting kaolin with carbonate of soda or carbonate of potash.

Preparation of Alkalimetric Solution.—In order to obviate the discrepancies arising from the impurities and varying state of hydration of commercial sulphuric acid, M. Humbert suggests[‖] the use of the bisulphate of potash for this purpose.

Volumetric Process for the Detection of the Adulteration of Potashes and common Salt.—F. Muck states[¶] that all potashes contain common salt, but normally no more than that the amount of chlorine may be 2 per cent. If the maximum normal amount of chlorine be taken at 2.5 per cent. for dry potash, the excess appears an intentional addition. The author therefore prepares a normal silver solution for the examination of potash for its amount of common salt. This contains $4\frac{4}{5}$ grs. of fused nitrate of silver in 100 cub. centims. A cubic centimetre of this fluid indicates exactly $\frac{1}{100}$ gr. of chlorine.

Of the potash to be tested, 10 grs. are supersaturated with nitric acid, and mixed with 25 cub. centims. of the silver solution. The chloride of silver is allowed to settle, and then a few drops more of the silver solution are added. If no precipitate is thus produced, the potash is not intentionally adulterated with salt, for as the silver solution corresponds with ¼ gr. of chlorine in 10 grs. of potash, the latter contains at the utmost 2.5 per cent. of chlorine.

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[*] *Archiv. der Pharmacie*, lxxxvii., 282.

[†] *Comptes Rendus.*

[‡] *Chemical Gazette*, No. 343.

[§] *Polytechnisches Journal*, cxlii., 45.

[‖] *Journal de Pharmacie.*

[¶] Wittstein's *Vierteljahrsschrift*, v., p. 538.

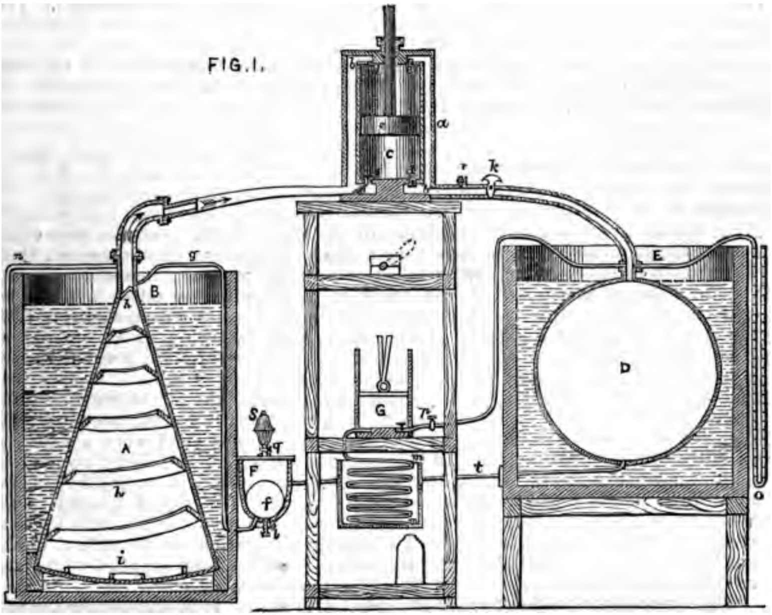
PRODUCTION OF ICE BY THE EVAPORATION OF ETHER *IN VACUO.*

A VERY ingenious process has been recently patented by Mr. Harrison, of Geelong, for the economical production of ice by the evaporation of ether or other volatile liquid in a vacuum. The process is exhibited in operation at No. 2, Broad Street, St. Giles's, where the patentee offers every facility for the examination of the apparatus employed. The apparatus consists of three principal parts :—1. An air-tight metallic vessel, from which the air has been removed by a pump, and in which ether is kept constantly evaporating ; 2. An air-tight metallic vessel, into which the ether vapour, as it is removed from the former vessel, is condensed under pressure ; 3. A pump, by which the vapour of the evaporating ether is withdrawn from the first vessel and forced into the second, where, as the pressure increases, it assumes the liquid state, ready to be again subjected to vaporization. The process is thus a continuous one, and is unattended by any appreciable loss of ether. The first and second vessels being surrounded by water, the cold caused by the rapid vaporization of the ether in the former causes the congelation of the water surrounding that vessel, while there is of course a corresponding increase in the temperature of the water surrounding the other vessel where the condensation is effected. The only expense attending the process is for the motive power by which the exhaustion and condensation are kept up. The pump is worked by a steam-engine, and the patentee calculates that a ton of coals, economically applied, will enable the engine to produce four tons of ice.

DESCRIPTION OF THE ENGRAVING.

Figure 1 is an elevation, in section, of the apparatus. A is a conical evaporating vessel of tinned copper ; B, a cistern for containing the water or other substance to be cooled or frozen ; C, a double-action pump, consisting of a cylinder *a*, of gun metal, with vapour passages, *b*, *b*; *c*, a leather piston ; *d*, *d*, valves for the admission of

FIG. 1.



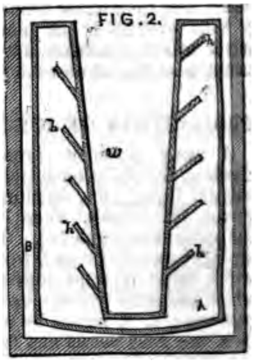


FIG. 2.

vapour from A; *e*, *e*, valves for the egress of compressed vapour; D, a spherical copper condensing vessel; E, a cistern, to be kept replenished with water, for the purpose of absorbing and removing the heat evolved by the condensation of vapour in D; F, a copper vessel for receiving the condensed liquid, fitted with a float valve, *f*, which will open when a depth of fluid accumulates in the vessel sufficient to raise the weight of the valve, as well as to overcome the pressure of vapour above the liquid. The valve being opened, the fluid will pass through the pipe *g* to the head of the evaporating vessel A, and be delivered upon a spiral shelf *h*, or strip of copper fastened round the inside of the cone, but only partially in contact with the side, so that the liquid will not only flow round the spiral, but ooze through and trickle downward, and thus keep the interior of the cone continually moistened with the liquid to be evaporated. This effect is found to be produced by having the edges of the spiral left rough; these edges are placed in contact with the cone, and fastened by solder at such convenient intervals as will ensure stability. The liquid which reaches the bottom of the cone falls successively over the frets or barriers *i*, *i*, which are so placed as to keep the greater portion of the bottom covered with the surplus fluid. *k* is a stop-cock for shutting off communication between the two parts of the apparatus; *l* is a screw for raising the float valve *f* when it is found desirable to open the communication between the two parts of the machine, as in creating the primary vacuum; G is a small single-acting pump, for obtaining the vacuum required at starting, and for restoring and maintaining a vacuum in the apparatus, in case a leak should exist in any part communicating with the air; a condensing worm, *m*, is attached to the egress pipe of this pump, with the view of saving whatever portion of ether should be expelled during its action. *n* and *o* are pressure guages; *n* is a barometer tube standing in an open cup of mercury; *o* is a double tube, filled to a height of fifteen inches with mercury, one leg being open to the air, so that either rarefaction or excess of pressure may be indicated. The apparatus is set in action by working the pumps, so as to produce a vacuum throughout the series of vessels. The stop-cocks, *k*, *p*, and *q*, being shut, the valve *f* raised by the screw *l*, and the tap *r* opened, the pump C withdraws the air from the whole of the vessels and tubes, except that portion of the passage between the egress valves *e*, *e*, and the stop-cock *k*. A good vacuum having been thus obtained, the tap *r* is shut, a pound of ether is poured carefully through the funnel *s*, the stop-cock *k* is opened, the small pump G is then set to work, the stop-cock *p* is opened, and the remaining air mixed with ether vapour is expelled through the worm *m*. Before the vacuum is completed, the large pump C should be worked for a few strokes, so as to expel any air that may remain about the valves and passages. After a short time the vapour withdrawn by the pump G will be almost pure ether, and when the pressure gauges show that a good vacuum has been obtained, there will remain throughout the apparatus an exceedingly rarefied atmosphere of ether vapour. The apparatus will then be ready to be fed with the ether intended for constant use; this must be pure rectified sulphuric ether, free from acidity. Shut the stop-cock *p*, open *k*, disconnect the small pump G, then pour four pounds of ether through the funnel *s*, taking care that no air enters with it; lower the screw *l*, so that the valve *f* may fall into its place; set the large pump C in operation. The vapour of ether will then be continually pumped out of the vessel A, and forced into the vessel D, where it will become liquefied by the pressure; the liquefied ether will pass along the pipe *t* to the vessel F, and when a sufficient quantity has accumulated there, it will raise the valve *f*, and be forced up the pipe *g* into the vessel A, to be again withdrawn, compressed, and liquefied, so long as the apparatus shall be kept at work sound and uninjured. The vapour formed in the vessel A will acquire its latent heat from the surrounding water or substance to be cooled or frozen in the cistern B. The vapour will give out its latent heat during condensation in the vessel D, so that this vessel must be kept supplied with water as cold as may be procurable where the apparatus is worked.

Fig. 2 represents another form of the vessel A in fig. 1. It is intended for the production of solid blocks of ice in the interior.

METEOROLOGICAL REPORT

From St. Mary's Hospital, Paddington, for the Year 1856.

BY MR. COPNEY.

(*Continued from page* 437.)

TEMPERATURE.

(*Readings corrected for Index Error and Diurnal Range.*)

	MONTHLY MEANS.						RANGE.			
	Dry Bulb Therm.	Wet Bulb Therm.	Max. during day.	Min. during Night.	Mean Temp.	Mean Temp. of Evaporn.	Highest Reading by Day.	Lowest Reading by Night.	Monthly Range.	Daily Range.
Jan. ...	40°.7	39°.3	45°.2	36°.9	40°.9	39°.5	53°.8	25°.5	28°.3	8°.3
Feb. ...	42.6	41.1	47.6	39.2	43.0	41.5	58.4	28.3	30.1	8.4
March.	39.3	36.9	46.1	34.3	39.8	37.4	61.0	27.5	33.5	11.8
April...	47.1	43.8	57.0	39.3	47.6	44.3	75.3	33.1	42.2	17.7
May ...	48.9	46.0	57.9	41.9	49.4	46.5	72.6	33.3	39.3	16.0
June ..	58.8	54.0	69.6	49.7	59.3	54.5	86.0	44.5	41.5	19.9
July ...	61.8	56.1	71.3	52.2	61.8	56.1	89.3	45.7	43.6	19.1
Aug....	63.9	59.8	?	?	64.8	60.7?	?	40.0?	?	?
Sept....	56.0	52.2	64.2	47.5	55.0	52.2	73.1	40.0	33.1	16.7
Oct. ...	52.9	51.0	59.2	47.3	53.1	51.2	67.8	33.0	34.8	11.9
Nov....	41.8	39.9	47.0	37.3	42.0	40.1	57.4	24.0	33.4	9.7
Dec. ..	41.0	39.6	45.7	36.6	41.1	39.7	59.4	21.0	38.4	9.1
1856.	49.6	46.6	55.5	42.0	49.9	47.0	89.3?	21.0	*68.3	13.5?

The mean temperature was much higher during January and February, especially the latter, than that of the same months in 1855.

1855 { January, 35°.7. February, 30°.6.
1856 { January, 40°.9. February, 43°.0.
Excess { 5°.2. 12°.4.

When the same months are compared with those of 1854, they are found remarkably coincident, there being a difference only of four-tenths of a degree in January, and of a degree and nine-tenths in February.

Note.—The mean temperature given above is thus obtained: the mean from the 9h. A.M. and 3h. P.M. observations of the dry bulb thermometer and that obtained from the maximum and minimum thermometers (both previously corrected) are added together, and the sum divided by two. These two values are generally either alike or very nearly so; and besides the fact that by their combination a nearer approach to the truth is attainable, they serve to check the reduction, inasmuch as any considerable discrepancy would constitute a reason for a revision of the process, and thus errors of calculation are more likely to be avoided.

The most remarkable month was December. The variations of temperature have been stated by some observers to be unprecedented. On the 2nd, the mean temperature was 29°.0; on the 8th, 56°.3—a difference of more than 27°.0. On the 4th, it was 34°.2; on the 6th, 53°.4; on the 28th, 27°.1; 31st, 46°.8. These changes are more readily seen by inspecting the diagram at p. 481.

The lowest temperature by night in the air was 21°.0, and occurred on the 28th of December. The lowest in 1854 was 16°.8; in 1855, 16°.4.

The lowest temperature on the surface of the ground was 19°.0, and occurred on the 30th of January. The lowest in 1854 was 8°.9; in 1855, 11°.5.

The warmest month of the year was August; the coldest, March.

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* Annual range.

COMPARISON OF THE TEMPERATURE OF 1856 WITH THAT OF 1854 AND 1855.

	Mean Temp.	Mean of Max.	Mean of Min.	Daily Range.	Extreme Range.	Mean of Max. in Sun.	Mean of Min. on Grass.
	°	°	°	°	°	°	°
1854	50.2	57.7	42.6	15.1	75.2	72.4	39.3
1855	47.9	55.1	41.3	13.9	69.6	64.2	37.2
Mean.........	49.1	56.4	42.0	14.5	72.4	68.3	38.3
1856	49.9	55.5	42.0	13.5	68.3?	63.4	41.6
Difference...	+ 0.8	— 0.9	——	— 1.0	— 4.1	— 4.9	+ 3.3

The most striking feature in this Comparison is the smaller amount of both terrestrial and solar radiation in the past year.

WEEKLY TABLE OF MEAN TEMPERATURE.

(*Derived from the Corrected Means of the Dry Bulb, Maximum, and Minimum Thermometers.*)

Week ending	°	Week ending	°	Week ending	°	Week ending	°
January 5	43.9	April 5	46.6	July 5	60.1	Oct. 4	55.6
12	38.4	12	47.8	12	57.2	11	54.1
19	40.0	19	47.6	19	60.0	18	54.1
26	46.0	26	49.7	26	65.5	25	54.6
Feb. 2	34.3	May 3	42.1	Aug. 2	69.3	Nov. 1	47.0
9	45.1	10	44.1	9	68.8	8	44.8
16	48.5	17	51.6	16	65.5	15	38.9
23	36.1	24	53.2	23	57.2	22	43.8
March 1	44.2	31	52.5	30	60.3	29	41.1
8	39.3	June 7	57.1	Sept. 6	58.9	Dec. 6	35.6
15	37.7	14	58.7	13	59.6	13	51.6
22	42.8	21	57.2	20	55.0	20	39.6
29	37.8	28	64.5	27	53.3	27	37.1

The weekly temperature was above the average of the year in twenty-five weeks; one of these was that ending December 13th, the temperature of which was precisely the same as that of the week ending May 17th (51°.6). A similar but more remarkable example of the fickleness of our climate occurred fifty years ago, and is recorded by Luke Howard, whose observations were made at that time at Plaistow, near London. He says :—"It is worthy of remark that the heat was the same on the 24th of December (1806) as on the 24th of June, on both those days the thermometer being nearly 60°."*

The nearest approach to the mean of the year was during the week ending April 26th (49°.7).

The hottest week, that ending August 2nd; the coldest, February 2nd.

The weekly temperature varied the least during the months of April and October; most during February and December.

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* *The Climate of London.*

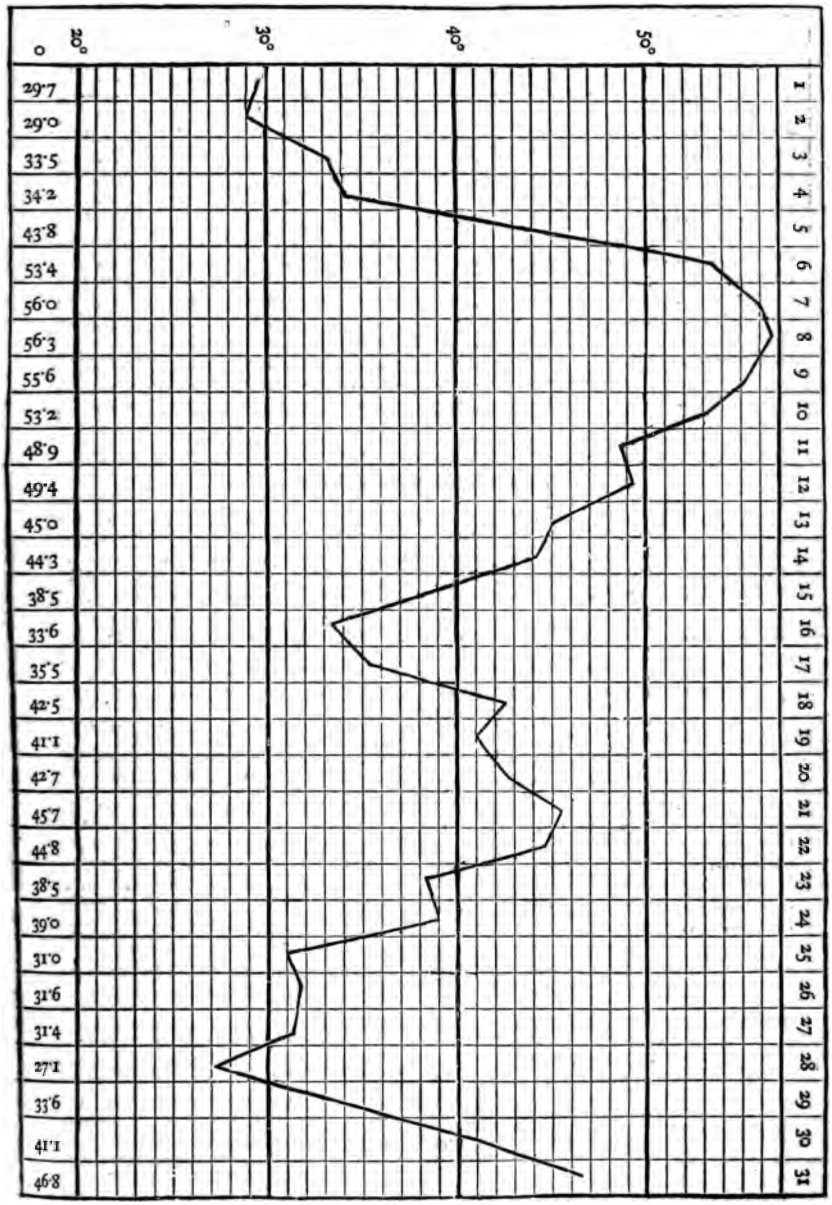

DIAGRAM representing the Variations of the mean daily temperature during the month of DECEMBER.—Mean Temperature of the mon th

HYGROMETRICAL RESULTS.

(Deduced from the Mean Temperature of Air and Evaporation by means of Glaisher's Hygrometrical Tables.)

	The Temp. of the Dew Point.	The Elastic Force of Vapour.	The Weight of Vapour in a cubic foot of Air.	Additional wt. required to sat. a cubic foot of air.	The degree of Humidity (complete sat. = 1).	The average weight of a cubic foot of air.
	°	in.	grs.	gr.		grs.
January	37.8	0.238	2.87	0.31	0.903	541.8
February	39.7	0.262	3.05	0.36	0.893	547.8
March	34.5	0.219	2.55	0.52	0.833	556.3
April	40.6	0.271	3.12	0.84	0.789	539.8
May	43.4	0.298	3.43	0.76	0.818	538.4
June	51.2	0.388	4.38	1.37	0.761	528.8
July	52.1	0.401	4.49	1.72	0.723	525.2
August	58.2	0.494	5.47	1.35	0.804	520.0
September	49.5	0.367	4.16	1.02	0.803	528.5
October	49.3	0.365	4.15	0.57	0.879	537.8
November	37.8	0.245	2.85	0.45	0.865	543.6
December	38.0	0.247	2.88	0.32	0.901	545.2
1856.	44.3	0.316	3.62	0.80	0.831	537.8

Difference between the Temperature of the Air and the Temperature of the Dew Point (i. e. *the Dryness of the Air*).

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1856
	°	°	°	°	°	°	°	°	°	°	°	°	°
Air	40.9	43.0	39.8	47.6	49.4	59.3	61.8	64.8	56.0	53.1	42.0	41.1	49.9
Dew Point	37.8	39.7	34.5	40.6	43.4	51.2	52.1	58.2	49.5	49.3	37.8	38.0	44.3
Difference	3.1	3.3	5.3	7.0	6.0	8.1	9.7	6.6	6.5	3.8	4.2	3.1	5.6

Comparison of the Hygrometrical State of the Air of 1856 *with its Condition in this respect in* 1854 *and* 1855.

	The Temp. of the Dew Point.	Difference between the Air Temp. & Dew Point.	The elastic force of Vapour.	Weight of Vapour in a cubic foot of air.	Additional wt. required to sat. a cubic foot of air.	The degree of Humidity (complete sat. = 1).	The average weight of a cubic foot of air.
	°	°	in.	grs.	gr.		grs.
1854	43.6	6.6	0.300	3.44	0.87	0.798	538.3
1855	42.6	5.3	0.303	3.47	0.75	0.839	539.8
Mean	43.1	6.0	0.302	3.46	0.81	0.819	539.1
1856	44.3	5.6	0.316	3.62	0.80	0.831	537.8
Difference	+1.2	—0.4	+0.014	+0.16	—0.01	+0.012	—1.3

QUARTERLY MEANS OF SOME OF THE PRINCIPAL ELEMENTS OF OBSERVATION.

1856.	ATMOSPHERIC PRESSURE.				TEMPERATURE.						HUMIDITY.		
Quarter ending	Mean Read. of Barom.	Mean of Max. Read.	Mean of Min. Read.	Quarterly Range.	Mean Temp.	Mean of Max.	Mean of Min.	Highest Reading.	Lowest Reading.	Averᵉ-age Daily Range	Temp. of the Dew Point.	Elast. Force of Vapor.	Deg. of Humidity.
	in.	in.	in.	in.	°	°	°	°	°	°	°	in.	
March 31...	29.843	30.534	29.406	1.705	41.2	46.8	37.3	61.0	25 5	9 5	37.3	0.240	0.870
June 30...	29.761	30.167	29.269	1.125	52.1	63.2	45.3	86.0	33.1	17.9	45.1	0.319	0.789
Sept. 30...	29.781	30.170	29.018	1.563	60.9	69.4	51.5	89.3?	40.0	17.9?	53.3	0.421	0.777
Dec. 31...	29.902	30.487	29.125	1.733	45.4	50.6	40.4	67.8	21.0	10.2	41.7	0.286	0.882

WIND.—PREVAILING DIRECTION.

(*The Numbers represent the Days on which the Current came from the Point indicated.*)

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Prevailing Direction during the Month.
January	—	8	3	5	1	7	3	4	E. and W.
February	—	5	3	—	1	12	3	5	W.S.W.
March............	—	17	7	1	—	1	2	3	N.E.
April	1	10	—	5	2	8	3	1	N.E. and S.W.
May...............	1	13	—	2	—	10	2	3	N.E. and S.W.
June	4	2	—	—	—	10	9	5	W.S.W.
July...............	—	2	—	1	1	16	4	7	W.S.W.
August	3	4	6	1	2	7	4	4	S.W. N.E.
September	—	2	3	5	1	8	3	8	W.S.W.
October	1	7	7	2	4	3	4	2	N.E. and S.W.
November	4	2	—	—	—	1	9	14	W. N.W.
December	1	3	—	3	1	8	6	9	S. W., W., & N.W.
	15	75	29	25	13	91	52	65	

RAIN.

(*The Quantity includes Melted Snow.*)

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1856
Quantity .	in. 1.53	in. 1.03	in. 1.06	in. 1.86	in. 3.44	in. 1.03	in 1.40	in. 3.14?	in. 2.49	in. 2.00	in. 1.38	in. 1.69	in. 22.05
No. of days	13	10	3	12	19	8	13	10?	14	14	14	15	142

Quantity in 1854, 18.01 inches; 1855, 20.83 inches; mean of the two, 19.42 inches. Excess in 1856, 2.63 inches.

SNOW.

Very little snow has fallen during the year. It is recorded on six days only: these are January 9th, 12th, 15th and 28th, November 26th, and December 3rd. In 1855, snow fell on sixteen days—chiefly in February; in 1856, none fell in that month.

HAIL

fell on six days; *i. e.* January 28th, April 6th, May 17th, 18th and 28th, and December 3rd.

FOG

prevailed most in January. There was a remarkable fog in May, on the 13th. Very dense on the 29th of October. The month of November had some very fine days, when fog was almost entirely absent.

THUNDER AND LIGHTNING.

January 24th, lightning only; May 17th and 28th, both; June 20th, thunder only; July 15th, both (lightning very brilliant); July 23rd, both.

OZONE

was strongly marked on May 18th and 19th; in the first three months of the year scarcely a trace. Most shown in April, May, June, and July. This element is still the subject of inquiry and discussion. The preponderating opinion would appear to be in favour of its being an active condition of oxygen—such an activity as is shown by many other bodies in the nascent state.

It has been urged that the test employed is liable to fallacy. Iodide of potassium is decomposable by other elements besides ozone. Free chlorine and its lower compounds with oxygen; nitric, but especially nitrous, or hyponitrous acid, will liberate the iodine. Should these be present in the atmosphere, they would undoubtedly cause the colouration of the test papers. The results obtained at this hospital are such as to lead to the belief that the indications afforded point to ozone. The papers are scarcely ever tinged when the wind is eastward, a direction the most likely to bring to this station any emanations arising from the varied sources of atmospheric impregnation of this wide-spread metropolis. Moreover, it has been noticed that, at the time of a thunderstorm, when the air is evidently charged with electricity, the papers are generally coloured. This happened in a marked manner on May 18th and 19th.

In conclusion, it may be remarked, that want of space precludes a further elaboration of the preceding tables. It would have been interesting, and perhaps useful, to have presented, for example, the quantity of rain, the mean height of the barometer, and the mean temperature, during the different currents of wind; and to have placed the observations of this station side by side with those of others in different parts of the country. However valuable in themselves, the observations of a given locality are only a link in the chain—a contribution towards that cosmical knowledge of climate, from which it is hoped a clearer insight into the laws which govern the weather may be attainable. The British Meteorological Society, established some six years ago, is proceeding vigorously. Government has assented to the importance of meteorology, and one of the first efforts is an investigation of the atmosphere impinging on the seas. Observatories are being established in the colonies. It is therefore probable that at a period not very remote we may be in possession of a comprehensive acquaintance with the climate of the entire terraqueous globe.

ACCIDENTAL POISONING BY PRUSSIC ACID.

On Tuesday, Dec. 30, an inquest was held before Mr. T. Wakley, coroner for West Middlesex, at the Bell and Horns Tavern, Brompton, respecting the death of William Marcooly, aged thirty-six, of No. 6, Brunswick Place, Brompton, who died on Saturday morning, Dec. 27, shortly after taking a dose of what had been sold as castor oil at the shop of Mr. Budd, Chemist, of Brompton Row.

Previous to the inquiry, the jury inspected the shop of Mr. Budd, to ascertain where the castor oil was kept, and to see the arrangement respecting poisons: the latter Mr. Budd showed were kept widely apart—generally in a closet, and not on the ordinary shelves.

Dr. Thomas Cahill stated that he saw deceased about a quarter of an hour before his death, and found him afflicted with stertorous breathing and other symptoms of having taken poison. Various means were tried to counteract it, without success. Witness made a *post-mortem* examination, and found prussic acid to the extent, as he believed, of about two drachms in the stomach. He also discovered a portion of prussic acid mingled with castor oil, both in the tumbler and in the phial from which the oil had been poured.

Other evidence having been given, proving the sale of the castor oil, Mr. Budd, at the request of the coroner, produced his book, showing what had been sold on the Saturday morning, when the following entries appeared:—"Castor oil, 3*d.*; prescription, 1*s.* 6*d.*" A copy of the latter was produced, and proved to be for a lotion containing hydrocyanic acid. The inquiry was then adjourned till the following Tuesday, when it appeared from the evidence of Mr. Budd, that his assistant, Joseph Burrows, had on the 27th of December, at the time the oil was applied for, dispensed a prescription for a lotion to a Mr. M'Carthy, containing among other ingredients one drachm of Scheele's prussic acid. The deceased, on swallowing the contents of the phial, sent to him, immediately fell on the floor insensible, and in a few minutes expired. The evidence leaving no doubt that the assistant had by mistake mixed the acid with the castor oil supplied to the deceased, the jury returned a verdict of "Manslaughter" against Joseph Burrows, who was accordingly committed to Newgate.

The trial took place at the Central Criminal Court, on February 5th, before Mr. Justice Wightman. Mr. Metcalfe conducted the prosecution: Serjeant Ballantine with Mr. S[illegible]gh appeared for the prisoner. A recapitulation of the above evidence was given, and a number of medical and other witnesses were called, who spoke favourably of the prisoner's character, and [illegible]s care in making up prescriptions. A rather strange [illegible]e of defence was set up by Mr. Ballantine, who, in remarking on the absence of positive evidence to show what the prisoner had really put into the bottle, said, it appeared to him, that a most important omission had been made in the evidence for the prosecution, by no proof being offered that the castor oil in Mr. Budd's shop was pure, and did not contain prussic acid.

Mr. Justice Wightman, in summing up, said, that to justify a verdict of manslaughter, it must be clearly made out that the act was not a mere mistake, such as every one was liable to, but that it was the result of some gross negligence on the part of the accused person, and it was for the jury to say whether such gross neglect had been established in the present case. The jury retired for nearly an hour, when they returned a verdict of "*Not Guilty*," at the same time expressing their strong reprobation of the careless manner in which poisons were generally dispensed. The prisoner was then ordered to be discharged from custody.

ACCIDENTAL DEATH FROM LAUDANUM.

On the 2nd of February, Mr. Bedford, the coroner for Westminster, held an inquest at the Reform Club, Pall Mall, on the body of Mr. William King Norman, who had for some years past held the office of secretary of that institution. From the evidence adduced on the inquiry, which lasted only a few minutes, it appeared that some time since Mr. Norman broke one of his legs, and from that time has been in the habit of taking laudanum to allay the pain, which sometimes had been very severe. On the previous Friday (Jan. 30) he suffered acutely in consequence of the cold, and took more than his usual dose,—a circumstance which unhappily resulted in his death. No *post-mortem* examination took place, and no chemical evidence was produced of the presence of opium in the body. It transpired that he had on the previous evening sent to his medical attendant for some laudanum, and a two-drachm bottle, labelled "Laudanum—poison," was found empty in his room. The jury at once returned a verdict of "Accidental poisoning."

SUICIDE BY STRYCHNINE.

A painful sensation was created in Newport last week by the report of the death of Mr. William Gummow from strychnine, administered by his own hands; and the fatal act is of importance to the world on account of the distressing symptoms which exhibited themselves for some five hours previously to his death. On proceeding to view the body, the coroner's jury found deceased in the same position in bed in which he died, and he presented a most fearful sight. His eyeballs seemed ready to burst from their sockets; his teeth were tightly closed; the features drawn and contracted, and the whole countenance frightfully distorted; his fists, too, were firmly clenched; his feet forced out beyond the foot of the bed; and his limbs in a state of fixed rigidity. The poison was bought by the servant of the suicide. The druggist recollected the latter coming to his shop, and asking for arsenic to kill rats. He gave him three grains of strychnine. "I have sold the same (said the druggist) for killing rats for four or five years to many persons: I write the word 'Poison' on my packages, and have not a printed label." The coroner and jury observed it would be much better to have a printed label. The deceased took the whole three grains. The doctor who attended him first tried strong emetics, which produced no effect; he then tried to use the stomach-pump, but his mouth was so firmly fixed, and the spasms and violent paroxysms were so powerful as to shake the gas-lamps in the room below, and he could not apply it. His body was bent in a curved form, as in lock-jaw. They were only such symptoms as would be produced by strychnine or hydrophobia. The spasms contracted and bent the feet, and the hands were clenched too; and he died in one of those convulsions, quite black in the face. From half an hour to two hours is the longest time known in such cases after spasms have commenced. Half a grain is enough to destroy life. The right side of the heart was found full of blood, and the left empty. It has been a disputed point (in the cases lately before the public) as to whether this side should be full or empty in cases of poisoning by strychnine, but there have been instances both ways. The lungs were blacker than usual, but the other organs healthy.—*Times, Feb.* 18, 1857.

SUICIDE BY OPIUM.

Mr. Joseph Morris, clerk of the North Brierley Union, died suddenly on Thursday, February 5. He had been in a state of great mental excitement for more than a week, and his sudden death having given rise to various reports as to its cause, an inquest was held on Monday, February 9, before Mr. G. Dyson, coroner. Dr. Kaye stated that he found deceased in an apoplectic condition, but could not say what was the cause of death without a *post-mortem* examination. In order that the examination and analysis might be made, the inquest was adjourned to Friday, February 13, when Dr. Kaye stated the result of his examination, and of the analysis made by Mr. Robert Parkinson, Bradford. The brain was found in a highly congested state, and had a larger amount of red points on its substance than is usual; all the other organs of the body were in a state of perfect health. The following is Mr. Parkinson's report of the analysis :—

On examining the jar which contained the stomach along with the ounce and a half of bronze liquid taken from the mouth of the deceased, I perceived an odour which I thought resembled that of opium, but I could not detect it, although I felt there was a peculiar odour from it. The stomach contained four ounces of thick brown liquid, and about a dessert spoonful of a brown powder, particles of which were adhering to its surface. Under the microscope the above powder had a striking resemblance to powder of opium similarly examined. The method strictly adhered to in the analysis was that of Professor Christison in his work on poisons. The liquids in the jar and the stomach were mixed and examined together. I examined two products. The first was a white crystalline solid, insoluble in water, soluble in alcohol and in diluted acids, acquiring thereby a strong bitter taste. Nitric acid applied did not produce an orange-red colour in the solid state, but an orange-yellow solution. Perchloride of iron did not produce any perceptible effect. We are of opinion that the above was the substance called morphia. The second product was a liquid, which when treated with perchloride of iron, gave an intense cherry-red colour, not destroyed by chloride of gold, and yielding no sulphuretted hydrogen gas with zinc and sulphuric acid. We are convinced that this liquid contained meconic acid. As the result of the above analysis, it is our belief that opium was contained in the stomach.

The verdict of the jury was, that the deceased had "Died from congestion of the brain, caused by taking a quantity of opium while in a state of temporary aberration of mind."—Condensed from the *Bradford Observer*.

CAMPHOR AN EFFECTUAL ANTIDOTE TO STRYCHNINE.

TO THE EDITOR OF THE TIMES.

Sir,—Your impression of this day (Feb. 18) records two more instances of life having been destroyed through the potent agency of strychnine.

The great importance of an effectual antidote being made universally known must be my excuse for begging a place in your columns for this brief communication.

In vol. ii., page 554, of the *Lancet* of 1848, Dr. Pidduck relates an interesting recovery from poisoning by strychnine. The patient was a weakly man afflicted with neuralgic pains, for which a quarter of a grain of strychnine was taken by mistake instead of one-sixteenth of a grain.

Five grains of camphor were administered in an emulsion, and almost immediately after taking the dose the spasms ceased.

Another successful recovery is reported by Dr. Tewkesbury, of Portland, Maine, viz.:—A boy was seized with convulsions, after eating a biscuit containing one grain and a half, for the purpose of killing rats. The spasms were so severe that immediate death seemed inevitable, though all the usual remedies were resorted to. Camphor could not be introduced into the stomach, on account of the locked jaw. Strong injections, therefore, of camphor were used, and the body immersed in a camphor bath, and in a few hours the boy was comparatively well.

I am, Sir, your obedient servant,
D. WILSON, M.R.C.S. Ed.

Times, Feb. 23.

COLLEGE OF DENTISTS.

On Saturday evening the inaugural meeting of the Members of this College was held in the concert-room, Hanover Square, which was crowded by all the leading Dentists of the metropolis. The chair was taken at eight o'clock, and the Secretary having read letters of apology from Lord Stanley, Baron Bramwell, and other distinguished personages, the inaugural address was delivered by the President of the College, Mr. Robinson, who was received by the meeting with continued cheers. After referring to the origin of the College, and the unanimity and satisfaction with which it had been greeted by the mass of the profession, the speaker went on to detail the rise of Dental Surgery, a practice for which he claimed a most remote antiquity, and which the discovery of both false and stopped teeth in Egyptian sarcophagi sufficiently proved. But though the ancients deserved great credit for the attention which their authors show them to have paid to the subject, it was not till the end of the sixteenth century that the Dental art began to be studied with the care which its importance deserved. Many treatises were then printed, and an attempt was made to classify the diseases of the teeth by Fouchard, who was justly considered as the father of modern Dental science, and who pointed out the indications which the teeth, in common with the adjacent parts, furnished of the general state of health. From that time such rapid advances were made in the study, that in 1772 the great John Hunter did not consider it derogatory to his reputation to give the profession the result of his dental investigations in his great work on the *Natural History of Teeth.* Their Transatlantic brethren had also done much in the walks of dental physiology and pathology; they held a high place in the profession, and had established colleges, though not without struggling with the same difficulties at the outset which they themselves had had to overcome. Much had been said about their wish to adopt the plans of the Americans, especially with respect to their colleges, but their only object was to give to professional skill in this country its rightful pre-eminence, and to crush the charlatanism which, in so many instances, had preyed upon the public health and purse. He believed the result which their labours would achieve would be to give such an elevation to their professional character as would command for the diploma of the College of Dentists of England the respect of that and every other country where dental science was practised. On the motion of Dr. Roberts, seconded by Dr. Bate, the thanks of the meeting were passed by acclamation to the President, who briefly expressed his acknowledgments and read a list of the course of lectures to be delivered in the ensuing session. The meeting then proceeded to examine the various preparations connected with Dental Surgery, which were displayed about the room in sufficient profusion to appal the stoutest nerves. Long rows of cold, bright instruments made the non-professional spectator cold and nervous, and every dental blemish in his system to twinge with sympathetic agony at sight of the blunt determined-looking forceps, which seemed constructed so as never to let go. Clever preparations of skulls were there, in which all those ill-conducted little nerves that go to constitute a "raging tooth," were laid bare and exposed to public scrutiny and indignation. The walls, too, were grim with dreadful sketches of all " the ills which teeth are heir to." One of these lively pencillings showed the back tooth of a megatherium—a dental monstrosity, about the size and shape of an ordinary wardrobe, and which, as it never could have been "extracted," we presume was only done to show the skill with which it might be "drawn." The proceedings of the evening terminated early.—*Times, Feb.* 16.

BOOKS RECEIVED.

L'Art Dentaire, Revue Mensuelle de la Chirurgie et de la Prothèse Dentaires. Par MM. Fowler et Preterre, Dentistes Américains. A Paris. Janvier, 1857. Vol. i., No. 1. On S'abonne chez MM. Fowler et Preterre, Paris; Baillière, London; Docteurs E. et A. Preterre, New York.

First Lines for Chemists and Druggists Preparing for Examination before the Board of the Pharmaceutical Society. By J. Steggall, M.D., &c., &c. Second edition. London: John Churchill, New Burlington Street. 1857.

Twenty Aphorisms, *with an Introduction in respect to Health and Healthy Respiration, principally with reference to Consumption and Scrofula.* By Henry M'Cormac, M.D., &c. London: Longmans and Co. Belfast: Shepherd and Aitchison. 1857.

Floræ Capensis Medicæ Prodromus; *or an Enumeration of South African Plants used as Remedies by the Colonists of the Cape of Good Hope.* By L. Pappe, M.D. Second edition, with corrections and additions. Cape Town: W. Brittain, 44, St. George's Street. pp. 52. 1857.

TO CORRESPONDENTS.

Jamaica Guano.—We are indebted to Mr. Horsley of Cheltenham for the following Analysis of a substance offered for sale under the name of Jamaica Guano :—

	Per cent.
Organic matter: Vegetable Humus	35
Inorganic matter: Carbonate of Lime, with traces of Phosphate of Lime and Sulphuret of Iron	65
	100

This sample was *perfectly destitute* of those principles usually associated with Guanos (such as Uric Acid and Ammonia), on which their efficacy mainly depends.

Areca Nuts.—*M. P. S.* (Durham) states that, from his own practical knowledge, Areca nuts are a powerful purgative, and act most effectually in expelling tapeworm. [This is not in accordance with the experience of those who have written on the subject.]

J. K. (Leamington).—Glycerine, as a substitute for cod-liver oil, is sometimes given in doses of a table-spoonful.

F. C. C. (Bath).—(1.) Attendance on lectures is not indispensable. (2.) The works adapted for the purpose are mentioned at page 440 of our last number. (3.) The art of prescribing is not included in the course of study for a Pharmaceutical Chemist.

Sigma (Leamington).—(1.) Yes. (2.) By the addition of spermaceti. (3.) The subscription to the Cavendish Society is one guinea per annum.

C. E. (Market Rasen.)—Table-spoonful.

G. J. (Worksop).—*Jockey Club Bouquet:*—

Extract of orris root	2 pints
Esprit de rose triple	1 pint
" rose, de pommade	1 pint
Extrait de cassie } de pommade, of each " tubereuse } de pommade, of each	½ pint
" ambergris	½ pint
Otto of bergamot	½ oz.

Piesse's *Art of Perfumery.*

D. W. (Oldham).—Chemists are not exempted from serving on juries.

Alpha (Commercial Road).—Marking Ink, if properly prepared, should not destroy the linen.

Chemicus (Wiveliscombe).—(1.) *Gamboge.* (2.) *Turmeric.* (3.) Serpentine, or snake-stone, consists principally of magnesia and silicic acid, its colour being due to oxide of iron.

A. M.—Apply by letter to the Secretary of the Veterinary College, Camden Town.

S. R. (Northampton).—We see no objection to the use of the mixture alluded to.

O. F. (Stalybridge).—The title "Pharmacien" is equivalent to Pharmaceutical Chemist, and cannot be legally used by one who is not a member of the Society.

A Life Member (Poplar).—*Patent Medicine License.* One license only is necessary, but notice of the two establishments should be given at Somerset House.

A. D. (Bishopsgate Within).—(1.) "*Ferri Acetas,*" *Glacial* Acetic Acid, is not intended; the insolubility complained of probably depends on the state of the oxide of iron. See page 452.—(2.) Loocck's lotion. Vol. xiii., page 440.

W. B. (Bury St. Edmunds).—(1.) There should be no precipitate.—(2.) Probably iodide of mercury.

Ignoramus.—The silver may be recovered in the form of a chloride by the addition of hydrochloric acid.

A. B. C. (Hammersmith).—Lindley's *School Botany.*

W. (Northampton).—There must be some mistake in the name, probably citrate of potash is intended.

Communications have been received from *Mr. Clarke*, *Mr. Atkinson*, and *A Chemist* (Haverfordwest), which we have only space to acknowledge this month.

Instructions from Members and Associates, respecting the transmission of the Journal, to the Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd) to Mr. Churchill, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XVI.—No. X.—APRIL 1st, 1857.

POOR-LAW MEDICAL RELIEF.

There is a continual strife between the promoters of the centralizing system of the Poor-law Board, and the advocates of local self-government. That some of the regulations of the Board are harsh and oppressive to the poor—that laws suitable to one parish or union, may be, and in many cases are, inapplicable to another—that local Boards are in general more competent than a central authority at a distance to deal with the wants and requirements of their respective localities,—are propositions which have been of late warmly discussed, and more or less supported by evidence.

An association under the name of the "Anti-Poor-law Board League," emanating from the parishes of Marylebone and St. Pancras, has, within a few months, opened an extensive correspondence with malcontents in parishes and unions in all parts of the kingdom, and is collecting evidence with a view of introducing an amendment of the law in the ensuing Parliament.

The only branch of the questions at issue which it comes within our province to notice, is the medical department, including the supply of drugs, in which there is great need of inquiry and reform. The underpaid Medical Officer of a parish or union has no means of redress. His remuneration is in some cases scarcely sufficient to cover the cost of the medicines supplied. The average payment per case varies from threepence to three or four shillings, with a few exceptions, in which a larger sum is given; but in a great number of cases the amount is less than two shillings per case. Many of the districts comprise an area of several miles in diameter, requiring the entire services of a horse (sometimes two horses), and the salary bears no definite or just proportion to the amount of professional labour and the necessary expenses. The Surgeon of the Sherbourne Union, for example, who lately resigned, travelled in one year 3111 miles; in nine years two horses were worn out in the work, the salary being £63 per annum with extras (£25 or £30) for amputations, fractures, and labours. It is estimated that the actual cost of medicines per case, exclusive of any allowance for rent and expenses of surgery, is not less than 1*s*. 6*d*. or 2*s*.; in tedious cases, it is several times that amount. The lowest estimate for the expenses of a horse and gig is £87 per annum—£100 would be a more correct amount. But the salary usually given is so inadequate as not only to afford no remuneration for professional services, but often to entail on the Medical Officer a positive loss. If, however, he should presume to remonstrate with his task-masters, and to represent the fact that he is a loser of so many pounds per annum, his services being given for nothing, he is referred to the Poor-law Board, and thence back again to the Board of Guardians; and if, no redress being granted, he still is dissatisfied, he is told that the remedy is in his own hands—he may resign—and the Board will soon find a young man fresh from some hospital eager for "an opening," and glad to make himself known in the neighbourhood by doing the parish work on any terms. This then is the alternative of the Poor-law Medical Officer. He must either continue to perform the duties on the miserable terms offered, or a rival is to be brought down to relieve him of this duty and at the same time take away a considerable slice of his private practice.

In May, 1856, a Poor-law Medical Reform Association was formed under the patronage of the Earl of Shaftesbury, and an extensive correspondence has taken place on the subject. Mr. Richard Griffin (of Weymouth), the Chairman of the Association, has published a valuable and interesting pamphlet, entitled "*A Statement of the Grievances of the Poor-law Medical Officers, with Remarks on Sanitary Measures and Vaccination*,"* addressed to the Right Hon. Viscount Palmerston. This pamphlet contains, in addition to much statistical information, a specimen of the *modus operandi* of the Poor-law Board in such cases, detailed in the correspondence of Mr. Griffin with the Board, which, after a rather voluminous exposition of facts and ample evidence of the grievance complained of, terminates with a simple acknowledgment of the receipt of Mr. Griffin's last appeal, and the assurance that "the subject to which it relates shall receive attention." This is the stereotyped answer to such communications. If it be true that "a mild answer turneth away wrath," the complainants in these cases have no reason to be angry, for nothing could be more mild than a form of words which has no definite meaning, being used in a figurative sense like the words "obedient servant" at the end of a letter.

On Thursday, March 12th, a large aggregate meeting of the Medical Students of the metropolis and the provinces was held at St. Martin's Hall, with a view of aiding the cause of Poor-law Medical Reform. Mr. Layard, M.P., took the chair; and several resolutions, affirming the existence of the evils complained of, and indicating a determination to persevere in obtaining redress, were ably supported and carried by acclamation.

It is the object of this movement to bring the subject under the notice of Parliament, with a view of obtaining the recognition and fair remuneration of the services of the Medical Officers of parishes and unions, the amount of salary being made to bear some definite relation to the services performed, expenses incurred, and goods supplied. It was demonstrated by the speakers at the above meeting, some of whom spoke from their own personal experience, that the prevalent custom of screwing down the Medical Officers is a source of increased expenditure; that, for want of a proper and efficient adaptation of means to the end, many cases of illness are protracted, and families thrown upon their parishes for relief; and that not only humanity, but economy, demands that the sick shall be cured as speedily as possible. It is also considered desirable that, wherever it is practicable, a separate provision should be made for the supply of medicines; for when the contract with the Medical Officer is so low as scarcely to cover the cost of the drugs required, the inevitable result must be a deficiency both in the quantity and quality.

The parish of Marylebone, not being under the direct control of the Poor-law Board, and having a densely-populated area to provide with medical relief, has the means of avoiding the abuses which prevail under the centralizing system, and at the same time carrying out the principle of the division of labour. The workhouse contains accommodation for nearly 300 patients in the infirmary, besides about the same number of "convalescents"—comprising aged, infirm, and imbecile. The entire number of inmates fluctuates from 1500 to 2000 or more. The number of medical orders for out-door relief ranges from 8000 to 15,000 in the year. The Medical Staff, prior to March, 1855, consisted of an Honorary Physician, an Honorary Surgeon, an Honorary Physician-Accoucheur, a Resident Physician (or Surgeon-Apothecary) at £150 per annum, a Medical Officer to the Workhouse at £80, two Visiting Surgeon-Apothecaries at £80 each, and two Dispensers at £60 and £40 with board and lodging. The medicines were purchased by sample and tender by a Committee, assisted by the Medical Officers, which sat quarterly, three or four respectable wholesale houses furnishing samples with prices. In case of an epidemic or unusual pressure from any cause, an additional Medical Officer (or more than one, if necessary) was temporarily engaged.

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* London: Simpkin, Marshall, and Co. Weymouth: D. Archer

By this arrangement the evils existing under the Poor-law Board were avoided. The supply of medical advice and medicine was regulated by the demand, all parties concerned, except the honorary staff,* were fairly remunerated, and the poor had no cause of complaint. These regulations subsisted with but little modification for many years, and might have continued up to the present time if differences had not arisen between the Medical Staff and the Guardians. The Board being a fluctuating body, annually elected, and consisting of tradesmen and gentlemen, some of whom, on coming fresh into office, had various notions as to the mode of sustaining the dignity of the Board, collisions with the Medical Officers sometimes occurred, and these gentlemen in their turn felt it to be their duty to support the dignity of the profession. Hence, while some of the Guardians would occasionally "snub" the Medical Officers, this treatment was resented by supercilious behaviour bordering on contempt; and, while the system was in theory such as might have been taken as a model for any parish of sufficient extent to carry it into effect, its harmonious working was practically impaired by occasional cabals, and an undercurrent of jealousy of "the doctors" on one side and contempt of the Guardians on the other. Sometimes for months together the business of the establishment proceeded harmoniously and apparently to the satisfaction of all parties, but occasionally, on some trivial circumstance requiring an explanation or inquiry, the latent spark of distrust or jealousy for a time renewed the struggle between the dignity of the Board and the dignity of the Profession.

In March, 1855, after a series of efforts and many close divisions, an alteration in the system was introduced. The Visiting Surgeons were dismissed, and the out-door poor placed under the care of five Medical Officers, being general practitioners, four of whom had salaries of £100 per annum, and the fifth £80, for attendance in their respective districts, including the supply of medicine. It was expected that by this change a saving would have been effected, and the discipline of the Medical Staff improved. Early in the present year a Committee was appointed to investigate the matter, and report as to the result of the experiment. From this inquiry it appeared that, for twelve months of the new system, the actual cost was £2015 1*s.* 3*d.*, or £379 16*s.* more than in 1854, while the number of patients was less, and the medical orders 1649 less than in the last-mentioned year. The Committee therefore recommended a further change in the system, which, after much discussion, was adopted by the Board, and is described in the following advertisement:—

"ST. MARYLEBONE WORKHOUSE.—The directors and guardians of the poor of this parish will meet in the Board Room of the Workhouse, on Tuesday, the 3rd day of March next, at 11 o'clock in the forenoon, to receive applications from duly qualified Medical Practitioners (about forty years of age), being Members of the Royal College of Surgeons, London, stating the sum at which they will contract to, on all occasions, medically attend the poor (being inmates of the workhouse), providing all drugs, chemicals, surgical instruments, and appliances (except trusses). The gentleman selected will have to reside in the immediate neighbourhood, to be accessible at all times when required, and to provide and pay the salary (which is not to be less than £100 per annum) of a legally qualified assistant, for whom the board of guardians will provide board, lodging, and washing. The board do not bind themselves to accept the lowest or either of the tenders. Applicants will have to attend personally at the time above mentioned, and the form of contract can be seen at the office of the secretary (who will afford every information); and letters of application, with diplomas, &c., must be left at his office on or before the day preceding that above mentioned.

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* The Physician formerly had £200 per annum, but upon a vacancy occurring, several candidates offered to take the office without salary, a proposition too tempting to be disregarded by the Guardians.

"(By order) THOMAS B. RAE, *Secretary*.

"*Secretary's Office*, *Feb.* 14, 1857."

Prior to the adoption of this resolution by the Board, the Honorary Physician and Surgeon were, very properly, consulted; but the opinions of these gentlemen, being decidedly adverse to the proposed change, were disregarded. The subject was also animadverted upon rather severely in some of the medical journals, which, of course, had no influence. It was doubted by some persons whether any Medical Men of standing in the profession would enter into competition for a position so speculative and precarious. The Medical Officer of a Union may be obliged to retain his situation on any terms, to keep a rival out of the way; but in this case no such motive could exist, and the statistics, on which alone any calculation could be founded, exhibited so much fluctuation in several of the items during a series of five or six years, that any estimate of the probable cost of the services and materials required could be little more than a random guess. Among the conditions of the contract, it is stipulated that the stock of drugs in the infirmary is to be taken at a valuation; that a room is to be provided by the Board, in which medicines are to be kept for use; but no tinctures, &c., are to be prepared on the premises, and no Apprentice is to be permitted to frequent the wards or the dead-house. The Resident Assistant is to be paid by the Medical Officer, but liable to dismissal by the Board of Guardians. The Medical Officer, also, is liable to dismissal by the Board; but, in the event of his resignation without three months' notice, he is to pay a penalty of £50. Some of the clauses in the contract are original; others are copied verbatim from the contracts prepared by the Poor-law Board for the Medical Officers of Unions. It appears remarkable that this system of farming the sick poor by contract, which is the most objectionable feature in the plan of the Poor-law Board, should have been imitated, and adopted in an aggravated form, in a parish where the mortal antipathy to that Board has called into existence a "league" for its reformation or suppression. It is no less unaccountable that a Board of Guardians, whose watchword is "local self-government," having every facility for carrying the theory into practice, should have stultified themselves by throwing on a contractor the entire responsibility of managing the medical department of the workhouse,—an implied admission of their own incompetence.

The number of competitors for the place considerably exceeded our anticipation: but the wide range of amounts in the tenders confirmed our impression as to the speculative nature of the venture. The highest tender was £1000, the lowest £500; the one accepted by the Board was £950. The successful competitor is a fully qualified and respected practitioner, a circumstance favourable to the success of the experiment, although it does not diminish our objection to the *principle* of making a contracting party responsible for the variable fluctuations of health and disease in a populous parish, whose representatives are in duty bound to regulate the supply of medical treatment and appliances according to the demand.

THE EDUCATIONAL FUNCTIONS OF THE PHARMACEUTICAL SOCIETY.

THE Legislature has given to the Members of the Pharmaceutical Society a title and status, as a recognition of the service the Society has conferred, and is continuing to confer on the public. It is therefore of the highest importance that those functions upon which our character as a body is founded, should be maintained unimpaired, with such modifications or improvements as circumstances may require.

The Pharmaceutical Society is not, in the ordinary sense of the term, an educating body; that is to say, it does not depend for its revenue upon the fees paid by Students for instruction in its School. This branch of the establishment has never been a source of profit; on the contrary, it has been attended with a considerable annual expenditure—an expenditure, however, which was necessary for the accomplishment of the objects contemplated by the Society, and which has contributed to its reputation as a scientific institution.

The Society having been empowered by Royal Charter to examine Candidates and grant diplomas or certificates, it was necessary to adopt effectual means for ensuring the requisite standard of proficiency. To a certain extent this object was sought to be attained by the circulation of a detailed programme, enumerating the branches of knowledge on which the Candidates were to be examined. Books on the several subjects were recommended, and those Students who had the opportunity, were advised in general terms to attend lectures on Chemistry, Materia Medica, and Botany. This, however, was seldom practicable. Young men residing in the neighbourhood of a medical school enjoyed some advantages, but their number was very limited, and no institution existed in this country in which the lectures were adapted expressly to the requirements of the Pharmaceutical Student. It was therefore considered expedient, and in fact necessary, to found a course of lectures on Pharmacy, with other lectures and practical instruction suitable for the purpose intended.

The Board of Examiners, in the first instance, found it necessary to deal very leniently with candidates, who presented themselves under great disadvantages, having no definite idea as to the extent of the knowledge they were expected to possess, or the course of study required for obtaining it. By degrees the nature of the examination became more generally understood, and some young men, by the aid of books and great personal industry, acquitted themselves much to the satisfaction of the Board. But the number of those who possess the tact and ability to qualify themselves unassisted, bears a small proportion to the entire class of Pharmaceutical Students; it is therefore of great importance to provide means of improvement adapted to the wants of the majority, and thus to remove the pretext for incompetence and mediocrity.

It is not necessary that any Candidate shall become a Student in the School of the Society. If he can qualify himself elsewhere, he is no less favourably received by the Board of Examiners. But to those young men who do not enjoy the requisite facilities for improvement in their respective localities, the School of Pharmacy affords every advantage that they could desire.

The lectures on Chemistry and Pharmacy, and on Botany and Materia Medica, are free to all Members and Associates, as well as to Candidates preparing for examination. The practical class of instruction in the laboratory is open to Students on terms which afford a very moderate remuneration to the Professor and assistants, and from which no revenue is derived by the Society. The course of study is adapted to the requirements of the Pharmaceutical Chemist, comprising two branches, synthetical and analytical.

The Lower Laboratory, containing accommodation for twenty Students, is devoted to synthetical operations, namely, the preparation of all the salts and other compounds of the metals, earths, alkalies, and acids, the processes of the Pharmacopœia, vegetable extracts, syrups, spirits, ethers, pigments, organic principles and products, &c.

The Upper Laboratory is chiefly devoted to analytical processes. It affords accommodation for ten Students, who are enabled to prosecute chemical researches to any extent that they may desire. The opportunity for classification, by means of an upper and lower laboratory, is found convenient. The more advanced Students, who are occupied with analytical processes, have occasion to use sulphuretted hydrogen and other gases, which might interfere with some of the preparations in the other department: it is also an advantage to provide separate accommodation for Students who are commencing the rudiments of their education, and for those who are more advanced and are engaged in tedious processes or delicate chemical manipulations.

The Library is accessible to all Students, and may be resorted to in the evening by those who desire to make the best use of their time and the advantages offered.

The number of Students usually ranges from twenty to thirty. Some enter for the entire season, comprising ten months, which is recommended as the best course to pursue when practicable; but others not being able to devote so much time to their education, the total number of young men who derive more or less benefit from the school in the course of the year amounts to thirty-five or forty. Assuming that all these young men qualify themselves, and sooner or later pass the examination, which we believe to be the case, and that some of those who pass obtain their education elsewhere, it will be seen that the supply of competent Pharmaceutical Chemists is sufficient to take the place of those who, in the ordinary course of events, die or retire from business; and while the Society is essentially an examining body, its educational functions are auxiliary to that object, and have the effect of raising the standard of qualification.

BOTANY.

With a view of encouraging the study of Botany, a branch of knowledge hitherto much neglected by Chemists and Druggists, Mr Bentley has obtained from the Council of the Royal Botanical Society admission for thirteen Students, during a certain number of hours each day, for the session. This will afford facilities for the study of the characters of plants, of which the garden contains an extensive collection, one portion of the ground being devoted exclusively to medical plants. As a further stimulus to industry, Mr. Bentley has made the enjoyment of the privilege to depend on the result of an examination in botany, held for the purpose; and has given the admissions to the thirteen Candidates whose merit at the examination entitled them to the distinction:—

Messrs. Samuel Banner, Robert G. West, J. P. Featherstone, A. Scholefield, Hugh Gill, Thomas J. Cutting, Charles Weston, P. C. Jones, William Sanger, J. Bourdas, C. F. Rowell, John Fletcher, W. Smeeton.

The orders are available for six months, and admit the bearer from 7 o'clock in the morning till 1 P.M. during the summer months, and from 9 A.M to 1 P.M. in the winter months.

The medal offered by the Council for the best herbarium of indigenous plants is intended as an additional inducement to study Botany, and the season is commencing during which the attention of Students may be favourably directed to this subject. The Pharmaceutical Chemist ought not to be at the mercy of the herbalist who supplies him with medicinal plants, but should be able to recognize, by their botanical characters and physical properties, all vegetable substances comprised in the Materia Medica, and to detect the accidental substitution of one drug for another if such casualties should occur.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

FINANCIAL STATEMENT,
From January 1st to December 31st, 1856.

RECEIPTS.

				£	s.	d.
Balance in Treasurer's Hands.........				333	2	0
5 Life Members' Fees ...	47	5	0			
Interest	33	13	10			
				80	18	10
Benevolent Fund:						
Subscriptions	46	6	0			
Interest	131	3	6			
				177	9	6
Government Securities, Interest ...				173	6	10
385 Town Members' Subscriptions...	404	5	0			
1777 Country Members...	1860	12	0			
274 Associates	143	17	0			
226 Apprentices............	118	13	0			
				2527	7	0
Fees:						
15 Pharmaceutical Chemists	94	10	0			
26 Assistants	128	2	0			
64 Apprentices............	144	18	0			
				367	10	0
Arrears of Subscriptions				97	16	6
Lecture Fees................................				22	1	0
Sale of Journals				4	14	6
Balance of Petty Cash due to Secretary				2	9	10
				£3786	16	0

EXPENDITURE.

				£	s.	d
Life Members' Fund Investment...				117	13	10
Benevolent Fund:						
Investment	111	7	9			
Gratuities	26	0	0			
				137	7	9
Invested in Government Securities				300	0	0
Repayments...............................				0	10	6
Conversazione, Pharmaceutical Meetings, &c.				42	19	9
House Expenses				35	18	8
Rent, Rates, and Taxes..................				297	15	6
Fixtures and Fittings				10	2	0
Apparatus				63	13	6
Postages.....................................				61	10	2
Stationery				13	2	3
Advertisements				15	7	0
Printing and Engraving				99	1	9
Collector's Commission..................				29	11	3
Board of Examiners				33	12	0
Expenses of Society in Scotland ...				57	13	10
Travelling Expenses, Country Members of Council..............				87	18	11
Salaries				300	0	0
Wages...				169	0	0
Journals......................................				662	10	0
Delivery of Journals				181	12	3
Library				19	5	0
Professor of Materia Medica and Botany, including duties as Curator in his department, and payment of Assistant				187	10	0
Professor of Chemistry and Pharmacy, including duties as Curator in his department, and payment of Assistant				225	0	0
Subscription to Royal Botanical Gardens				21	0	0
Solicitors' Costs				5	12	6
Balance in Treasurer's hands.........				504	16	0
" in Secretary's ditto........................	107	2	1			
Less Post-office Order out of date	0	10	6			
				106	11	7
				£3786	16	0

We, the undersigned Auditors, have examined the accounts of the PHARMACEUTICAL SOCIETY, and find them correct, agreeably with the foregoing Statement, and that, as shown by the books of the Society, there was standing in the names of the Trustees of the Society, at the Bank of England, on the 31st of December, 1856:

		£	s.	d.
On account of the General Fund	New 3 per Cents.	6345	4	8
Benevolent Fund......	3 per Cent. Consols ...	4801	1	1
Life Members' Fund,	3 per Cent. Consols ...	1325	18	7
And at that date there was due to the Life Members' Fund......		10	10	0

GEORGE S. PEDLER,
JOHN CARR,
WILLIAM BOWER,
ADOLPHUS FREDERICK HASELDEN,
ARTHUR BOWDLER HILL,
} *Auditors.*

3rd February, 1857.

Correct—S. T. COOPER, *Accountant.*

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES (*continued*).

Elected in March.

MEMBERS.

Liverpool	Marks, Edward Lloyd
London	Andrews, Frederick
	Francis, George
	Frask, Thomas

MAJOR EXAMINATION.

Patterson, Douglas John	Nottingham
Smeeton, William	Ironbridge
West, Robert G.	Liverpool
Weston, Charles	Lincoln

MINOR EXAMINATION.

Brown, John	London
Dixon, Henry	Spalding
Jones, Humphrey	Chester
Wheldon, Henry	Atherstone
Valancé, Charles Poupinel	Mauritius

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH	TOWNS.
Carre, Louis C. A.	Mr. Tylee	Bath
Dunhill, William W.		Doncaster
Edwards, Frederick H.	Mr Medcalf	Lower Tooting
Gibbs, Thomas	Mr. Stewart	Great Yarmouth
Goldfinch, George	Mr. Goldfinch	London
Hill, Francis	Mr. Reinhardt	Leeds
Langley, William	Mr. Tylee	Bath
Oliver, John H.	Mr. Fletcher	Cheltenham
Price, Thomas	Mr. Laen	Pembroke Dock
Walker, George	Mr. Goodall	Derby

AT A MEETING OF THE COUNCIL,

Held February 4th, 1857,

The following Members of the Council were drawn by lot to remain in office for the ensuing year:—Jacob Bell, Thomas A. Brew, John B. Edwards, Daniel B. Hanbury, George R. Keeling, Nathaniel Smith, and George Waugh.

PHARMACEUTICAL MEETING,

Wednesday, March 4th, 1857,

MR. BIRD, VICE-PRESIDENT, IN THE CHAIR.

The following donations were announced:—

Journal of the Society of Arts, from the Society.

Journal of the Photographic Society, from the Society.

London University Calendar for 1857, from the University.

London Pharmacopœia for 1746, from Mr. G. Whipple.

Seeds of *Cycas revoluta*, from Foo-Chow, China. A very fine specimen. From Mr. D. Hanbury.

A large Crystal of Potash Iron Alum, from Mr. Copney.

Mr. Daniel Hanbury exhibited a specimen of *Liquidambar orientale* (of Miller), from the coast of Asia Minor, opposite Rhodes.

The following papers were read:—

ON THE TOXICOLOGY OF STRYCHNINE.

BY J. E. D. RODGERS, ESQ.,
Lecturer on Chemistry at St. George's School of Medicine; and

G. P. GIRDWOOD, ESQ.,
Assistant-Surgeon, Grenadier Guards.

CAN strychnine be detected after death, when it has been administered in a dose only sufficient to destroy life? or is it so altered in the process of destruction of life, as to cease to be strychnine? are questions that it is the object of this paper to answer.

Let us first inquire the facts upon which the opinion that strychnine *cannot* be detected in the tissues and fluids of the body is based, and it will soon be seen that they are of the most slender nature, founded on the results of experiments and analyses of a most unsatisfactory and imperfect character.

Dr. Christison, many years ago, poisoned animals with doses of strychnine varying in strength, and generally failed in its discovery by subsequent analysis. Dr. Taylor, at the trial of William Palmer, gave in evidence that he had killed four rabbits by the administration of strychnine. In the first experiment he gave two grains; in the second and third, one grain; and in the fourth, half a grain; and failed to discover it by chemical means in three out of the four—the successful case being that in which he had given the large dose of two grains—a dose which every one must admit far exceeds the quantity necessary to destroy life. Drs. De Vry and Van de Burgh, from their interesting and well-devised series of experiments, the results of which were given in a paper read at the last meeting of this Society, have come to the conclusion that it can only be detected when the dose given exceeds that necessary to destroy life.

Let us next inquire what are the essentials of a process that will enable the analyst to obtain the strychnine in such a condition as to prove its presence indubitably. They are, that it should be capable of disintegrating the substances in which it is present, so completely, that it cannot escape solution; and that, finally, it should yield the strychnine in a state of perfect freedom from foreign organic matter.

Have the processes employed by Drs. Christison, Taylor, De Vry, and Van de Burgh these requisites? Decidedly not. The process given by Dr. Taylor at the trial of Palmer—and Dr. Christison stated on that occasion that he had pursued a similar mode of analysis—consisted in digesting the matter suspected in spirit of wine acidulated with sulphuric acid, filtering, gently evaporating, and finally adding carbonate of potash to precipitate the strychnine, which was then tested. We need scarcely remark that such a process would never yield strychnine, if present in minute quantity, in that state of freedom from organic matter to admit of satisfactory testing, and would utterly fail when blood, urine, and tissues were the subjects of analysis; indeed, it is obvious that the minute quantity to be extracted in the latter analysis could never be precipitated at all, seeing that each drop of water is capable of retaining $\frac{1}{7000}$ of a grain of strychnine. The process of Staâs adopted by Dr. De Vry is immeasurably superior to the preceding, but that it is not possessed of the requisite degree of perfection is evident from his own experiment cited in proof of its perfection. This experiment, you may remember, consisted in mixing the quarter of a grain of strychnine with one egg, and then coagulating the mixture by the heat of boiling water, and subjecting it to Staâs' process, by which he recovered "*almost the whole*" of the strychnine. This word "almost" proves the imperfection of the process, for it shows that under favourable circumstances a quantity appreciable by the balance was lost, while in the analysis of urine, bones, and small quantities of the other tissues, you have to separate an amount of poison that is quite inappreciable by the balance. The loss is owing to the fact that the spirit of wine and acid employed do not disintegrate the tissues in the manner necessary for the separation of the quantity of strychnine conveyed by the blood to the various tissues and organs; indeed, the hardening effect of the spirit would rather favour the retention than the separation of the strychnine.

The process adopted by us is as follows:—The substance operated upon is digested with dilute hydrochloric acid, one to ten, until it is apparently fluid; the liquid is then filtered and evaporated to dryness over a water-bath, treated with spirit as long as anything is dissolved, and the filtered tincture evaporated as before, and the residue treated with water and filtered; this aqueous solution must now be rendered alkaline by ammonia, and agitated in a bottle or long tube, with about half an ounce of chloroform; after subsidence, the chloroform is drawn off by means of a pipette, transferred to an evaporating basin, and the chloroform expelled over a water-bath; the residue must then be moistened with concentrated sulphuric acid, and exposed for some hours to the temperature of a water-bath, by which proceeding all organic matter except the strychnine is destroyed. The charred mass is then treated with water, and the solution filtered to separate the carbon; excess of ammonia is now added, and the solution again agitated with about one drachm of chloroform; if on evaporating a small portion of this chloroform solution, and treating the residue with concentrated sulphuric acid, any charring takes place, the preceding process must be repeated, when the last chloroform solution will afford the strychnine sufficiently pure for conclusive testing. For this purpose a small quantity is taken up in a capillary tube, and allowed to evaporate on the smallest spot possible of a warm porcelain capsule, by adding successive drops until the whole is evaporated on the spot. If the quantity is large—say from the $\frac{1}{2000}$ of a grain to a larger quantity—the method we have pursued is similar to that employed by Dr. De Vry and others, viz., moistening the spot (when the capsule is quite cold) with concentrated sulphuric acid, and then adding a minute fragment of bichromate of potash. If, however, the quantity is very small, no colour will be perceived by this mode of testing, then the sulphuric acid rendered slightly yellow by chromic acid will be found successful.

We would here remark that the recommendation to stir the spot moistened with sulphuric acid with a glass rod, previous to the addition of the bichromate, is highly objectionable, and will frequently occasion failure, by removing the acid sulphate of strychnine, which would otherwise, by adhering to the porcelain, facilitate the action of the test. The superiority of our mode of operating will be seen by the following analyses, performed during the last few days. On the 26th ult., at three o'clock P.M., $\frac{1}{30}$ of a grain of strychnine was given to a rabbit weighing nearly four pounds; at four a second $\frac{1}{30}$; at half-past four a third dose was administered, after which he evinced slight signs of twitching on being touched, or on a noise; at five a fourth dose was given; at half-past five a glass beaker fell and was broken near him, which caused a sudden spasm with opisthotonos (lasting fifteen seconds); at a quarter to six another $\frac{1}{30}$ (making $\frac{5}{30}$ths) was given; at twelve minutes past six a bunch of keys was dropped near him; the noise occasioned an immediate spasm, accompanied, as before, with opisthotonos, which lasted a few seconds; a second on touching him, followed by a remission; when, on again touching him, a third attack was produced, which ended fatally in a few seconds, relaxation of all the muscles indicating decease; rigor mortis came on in three minutes after death, and passed off in the succeeding twenty-four hours. On examination the blood was found coagulated. The contents of the stomach, analyzed by the process given, yielded strychnine in abundance.

Half a pound of flesh also yielded strychnine in abundance. Two drachms of urine collected after death, also yielded strychnine by the following mode of analysis: it was diluted with an ounce of water, rendered alkaline by ammonia, and filtered; the filtrate was then agitated with chloroform in a long tube, the chloroform separated as directed, was then evaporated in a porcelain dish, the residue charred with sulphuric acid, as already detailed; this operation was repeated three times, when the last chloroform solution yielded the strychnine as stated.

The bones of the extremities, the pelvis, and part of the vertibral column, containing its share of the spinal marrow, all being entirely denuded of flesh, were treated as follows: They were covered in a deep evaporating basin with dilute hydrochloric acid, and digested over a water-bath until the whole were dissolved; the solution filtered, the filtrate was then treated with concentrated sulphuric acid drop by drop as long as a precipitate fell, adding water when necessary; the solution was again filtered, and about six drachms of sulphate of magnesia and ammonia in excess added; the solution was again filtered, and the clear liquid agitated with chloroform; the chloroform solution, after being treated in the way already detailed, yielded distinct evidence of strychnine.

To these results must be added our former experiments, which we have already published, and which were briefly as follows:—

The blood and contents of stomach of a dog poisoned by two grains of strychnine were, after putrefaction, subjected to analysis, both yielding strychnine.

The muscles, viscera, and bones of a dog, poisoned with a grain of strychnine, were separately subjected to analysis, thirteen months after interment. Strychnine was discovered in every instance.

The organs and contents of stomach of a rabbit, poisoned by half a grain of strychnine, yielded that alkaloid in each analysis.

The viscera and contents of stomach of a rabbit poisoned by half a grain of strychnine and five grains of tartar emetic, yielded antimony and strychnine also in each analysis.

The body of this rabbit was allowed to decompose in contact with air for nine months. When dry, the bones separated, and all the other tissues, almost pulverulent, subjected to the mode of analysis described by us for the bones, yielded abundance of strychnine.

From the results of the foregoing experiments, we cannot avoid the following conclusions:—

(1.) That the opinion, that strychnine can only be detected when the poison is in excess, is untenable, and not supported by trustworthy analyses.

(2.) That the opinion, that strychnine is decomposed in the process of destruction of life, is founded on the results of analyses made by imperfect processes, and hence is unsound and unphilosophical.

(3.) That strychnine can always be detected, when it has occasioned death, in the blood, organs, and tissues of the body, quite independently of the contents of the stomach.

(4.) That it is found unchanged in the urine.

(5.) That the delicacy of the reactions of strychnine, and its extraordinary stable qualities, render its detection more certain than any other poison.

Dr. De Vry was glad that, happening to be in London, he had an opportunity of hearing the interesting communication just read. He had no hesitation in saying that he thought the process described by Mr. Rodgers for extracting the strychnine from organic substances a very good one, and he purposed making trial of it when he returned to his own laboratory.

Mr. Copney mentioned a case in which he failed to detect strychnine in the urine of a patient taking the alkaloid, although he adopted the process recommended by Mr. Rodgers for its detection.

Mr. Rodgers said that in such a case as that alluded to by Mr. Copney it might be necessary to operate upon a larger quantity of the urine than was used in the experiment described.

THE URARI, OR ARROW POISON OF THE INDIANS OF GUIANA.

Remarks in continuation to those contained in the seventh volume of the Annals of Natural History.

BY SIR ROBERT H. SCHOMBURGK, Ph.D.,
Honorary Member of the Pharmaceutical Society of Great Britain.

I PUBLISHED after my return from Guiana, in the *Annals of Natural History*, some remarks on the urari[*] poison of the Indians of that territory, principally as prepared by the Macusis, who occupy the open country between the rivers of white waters, namely, the Rupununi, Takutu, and Parima, or Rio Branco. The latitudes 2° and 3° north, and the longitudes 59° and 61° west from Greenwich,[†] circumscribe the country over which their settlements are dispersed, comprising about 21,000 square miles.

My former observations, and the experiments which I had made with this poison, were reawakened by the perusal of some remarks in the *Journal de Pharmacie et de Chimie*.[‡] which induce me to state again my opinion on the true nature of this terrible substance.

As many of the readers of the Transactions of the Pharmaceutical Society may not be acquainted with the preparation, nature, and effect of the urari, I trust it may not be considered a useless repetition to give a general outline of what I have previously stated in this regard in the *Annals of Natural History*. The active principle of this, the most dangerous of all poisons, seems still enveloped in obscurity. It has been so for centuries past. Although the first discoverers of the New World made it already known that the aborigines employed different substances to poison their arrows, the action of that poison seems to have been very different from that of the urari. Oviedo, the contemporary of Columbus, who passed many years in the New World, and had at various times occasion to see the effect of the poison, says, that the people who had been wounded became ravingly mad, biting themselves in the paroxysm of pain until death ended their sufferings.[§] Herrera confirms this account, and asserts that the ingredients of the poison consist of a root which is found on the sea-shore, and has a very bad smell, of black stinging ants, as large as beetles, spiders, nasty hairy caterpillars of the size of half a finger, which sting as badly as the ants, bats' wings, the neck and head of a poisonous sea-fish called tabrino, toads, and necks of snakes, which ingredients were boiled with the fruits of the manzanilla by a male or female slave outside of the village; for the fumes which arose from these poisonous materials were so injurious, that the person who had to prepare the poison fell always a victim and died. This historian attests already, that in order to be effective, it must come in contact with the blood; if this be the case, and let the wound be as small as that inflicted by a pin, the wounded person pays it with his life. The remedy then known was to apply fire to the wound, and to keep a strict diet and be abstemious. Others pretended, in harmony with the superstitions of those times, that the fœces of the person who had been wounded should be taken inwardly in pills or otherwise.[||]

Here we have, then, in all its prominent features, the account surrounded by superstition of the component parts and the preparation of the arrow poison, which, repeated by the fathers Gumilta and Gili, has become the text-book from whence many who have since written on the arrow poison have taken their account of the preparation.

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[*] To be pronounced as if it were written Ourahree.

[†] Near the Mausi village Pirara, within this district, is the site of Sir Walter Raleigh's and Keymis's supposed "El Dorado."

[‡] Tome xxx., p. 148, *et seq.*

[§] Oviedo, *Historia General y Natural de las Indias*, lib. ii., cap. 8. The historian relates in lib. vi., cap. 48, that in the commencement of the discovery no remedy had been known, but that a certain hidalgo, Garcia de Montalos, then residing in the island of Cabagua, dreamt he had been wounded by a poisoned arrow, and applied corrosive sublimate to the wound, with which he cured himself. On awaking he thought the dream of too great importance to pass it entirely over; and in one of the battles with the Indians, a soldier having been struck by a poisoned arrow, he applied the corrosive sublimate, and the man recovered. From this time the Spanish soldiers always carried corrosive sublimate with them whenever they had to go to war with the Caribs and other Indians that used poisoned arrows.

[||] Herrera, *Descripcion de las Indias Occidentales*, de. i., lib. cvii., cap. 16.

Sir Walter Raleigh, in his *Discovery of the Empire of Guiana*, observes: "There was nothing whereof I was more curious than to finde out the true remedies of these poisoned arrowes, for besides the mortalitie of the wound, they make the partie shot indureth the most insufferable torment in the world, and abideth a most vglie and lamentable death, sometimes dying starke mad, &c. * * * Some of the Spaniards have been cured in ordinary wounds of the common poisoned arrowes with the juice of garlike, but this is a general rule for all men that shall hereafter travell the Indies, where poisoned arrowes are used, that they must abstaine from Drinke, for if they take any licor into their body, as they shall be maruellously provoked thereunto by drought, I say if they drink before the wound be dressed or soone vpon it, there is no way with them but present death."

The interest respecting this celebrated poison, and the nature of its ingredients, was kept alive. Every traveller returning from Guiana, from the Amazon, and the Brazil, brought new accounts of its preparation and its effects ; the relation still surrounded with marvels, amongst which the admixture of snakes' teeth played a great figure. At the commencement of the nineteenth century, the Nestor of scientific travellers, Baron Alexander von Humboldt, gave an authentic account of its preparation, attesting that neither snakes' teeth nor stinging ants formed any of its component parts, and that the active principle was derived from a plant, which he considered to belong to the *Strychneæ*. Von Martius, the great Brazilian traveller, attests that the chief ingredient of the arrow poison of the Indians of the Yupura, is the bark of a slender tree, which in the Tupi tongue is called Urari-riva, the *Rouhamon Guianensis* of Aublet, much allied to a plant which Mr. Bentham, in the enumeration of my Guiana plants, has called *Strychnos cogens*, which is still employed by some of the Indian tribes for the preparation of their arrow poison. Dr. Peeppig, in his *Reise in Chili, Peru, und auf dem Amazonenstrome*, observes with respect to the arrow poison of Peru:—"The supposition occasionally met with in Peru, that animal poisons were mixed in the composition, has not met any confirmation." The preparation of the urari, as practised by the Juris, Passes, Miranhas, and Ticunas,* Indian tribes of the rivers Amazon and Yupurara, was witnessed by Von Martius, who asserts that no animal substance was added to it.

Not contented with the report of the simple method of its preparation, Mr. Charles Waterton, the author of *Wanderings in South America* (a book delightful to read, vivid and animated in the descriptions of the glorious scenes which nature presents in Guiana, but devoid of scientific researches), introduced again the account given by Herrera, Gumilla, &c., reinstating snakes' teeth, stinging ants, &c. But Mr. Waterton had never been present when the poison was prepared, nor had he seen the plant in its native growth which furnishes the active principle. He reports merely what had been communicated to him in this regard by some of the crafty Indians, whose interest it was to surround the whole with mystery.

The name by which Mr. Waterton introduces this famous poison is even spurious. The Macusi Indians, the most famed tribe for the preparation of the true poison, call the plant which furnishes it Urari-ye, and the poison itself urari, which the Carabisis or Caribs, who are not able to make a proper distinction between the sound of r and l, have corrupted into Ulari and Urali, of which Mr. Waterton has made Wourali.† Raleigh had heard, during his voyage, that the Indians call a vegetable substance, with which they poison their arrows, "Ourari," and under that name it occurs again in the list of "names and rivers" as a poisonous herb.‡ Herrera mentions the word Urari,§ and it exists to this day in the name of the rivers Urari-Capara and Urari-Cuera, which at their confluence form the Rio Branco. Von Martius and Von Spix, in their *Travels in Brazil*, observe that during their exploring tours up the Amazon, Yupura, Rio Negro, &c., they heard the poison pronounced as Urari, but never Wourali.‖ It is surprising, therefore, why a spurious name should have been substituted in England for the true one, which Raleigh already reported in 1595 to be Ourari.

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* The Macusi and Wapisiana Indians place their poison, when finished, in calabashes, as the vessels made out of the fruit of several species of *Crescentia*, after the inside has been scooped out, are called. The Indians of the Amazon, Yupura, Rio Negro, &c., put it in earthen vessels of various shapes. No Indian of Guiana would purchase the poison offered for sale in earthen vessels, knowing that in this shape it does not come from the right source.

† Waterton's *Wanderings in South America*, 4th edition, p. 46.

‡ Keymis, in *Hakluyt*, vol. iii., p. 687.

§ Dec. ii., lib. x., cap. v.

‖ *Reise in Brasilien München*, vol. iii., p. 1155.

I had made myself acquainted with these facts before I commenced my exploring expeditions in the interior of Guiana, and it may be conceived that I was most anxious to become acquainted with the ingredients which formed the famous urari poison, and the plants which furnished its component parts. I was fortunate enough to accomplish my wish during the first expedition, which, under the direction of the Royal Geographical Society of London, and under the patronage of the British Government, I undertook, in 1835, to explore the interior of Guiana. The plant which Humboldt was prevented from seeing, and which was one of the chief objects of Mr. Waterton's *Wanderings*, but without success, I saw growing at its natural place in 1835.[*] Humboldt, with his usual sagacity, pronounced, from the mere sticks which the Indians had brought to Esmeralda for the preparation of the poison, that the plant from which they came belonged to the *Strychneæ;* and such I found it to be, although it was at that time not in flower. I have described it as *Strychnos toxifera.*[†]

The plant which furnishes the active principle of the urari poison having been discovered, it remained now to ascertain the mode of its preparation, and to learn what other materials are added to it. This I could only ascertain during my third expedition in 1837. The Wapisianas, but principally the Mausi Indians, are the most famed for the preparation of the urari poison. The Indians of the Orinoco itself acknowledge it, and only use the Curare, the preparation of which Humboldt witnessed at Esmeralda, when they cannot procure any of the poison made by the Macusis ; the Maiongkong, and Guinare Indians, who inhabit the northern tributaries of the upper Orinoco, undertake journeys to the country of the Macusis, merely for the purpose of bartering the urari, giving in return the Curata, that admirable reed, which is sometimes sixteen feet long without an internode, and of which the celebrated blowpipes or sarbacans are made.[‡]

From what I learned from the Macusis and Wapisianas, during my first expedition, they use the bark of the woody parts of the *Strychnos toxifera* and its alburnum, both of which are considered to possess the poisonous principle in the highest degree. Young shoots are not employed for that purpose. The bark, after having been stripped from the wood, is pounded and steeped in water, to which effect a new earthen vessel is employed. Here they allow it to remain for some days, well covered, until the water is of a yellowish colour, when it is filtered by means of a simple mechanical operation. Several other plants have been meanwhile procured, of which infusions are made in a similar manner, which are added to the urari at the moment it has been concentrated on a slow fire to the consistency of a thin syrup. The addition of the juices obtained from the other plants gives a darker colour and greater consistence to the urari, which, while still fluid, resembles thick tar. It is now put into small calabashes, which are covered with leaves, to prevent the poison from coming in contact with the air. If it is to be used, the quantity required is put into a calabash, and a little juice of the cassava is added, to render it more pliable. I was told that the addition of cassava-water, as the expressed juice of the root of the *Jatropha manihot* is termed, reawakens the slumbering powers of the poison, should it have lost its strength by age. After this juice has been added to it, the Indian buries the calabash with the poison for a day or two under the ground.

This is the simple account of the preparation of the urari, as practised by the Macusis and Wapisianas. There is no danger whatever in the preparation, and the vapours which are disengaged are entirely innocuous. But in the same manner as the charlatan and empiric surrounds his sovereign cure against all evils flesh is the heir of with mystery, thus the Indian, for his advantage, surrounds the preparation of this deadly poison with superstitious customs. The circumstance that it requires several days to watch the pot closely on the fire, taking off the scum before it is properly concentrated, prevents the Indian, with his natural indolence, from preparing the poison more than once or twice a year.

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[*] *Journal of the Royal Geographical Society of London*, vol. vi., p. 251.

[†] See Hook., *Ic. Pl.*, t. 364 and 365. My brother, Richard Schomburgk, has been successful to meet the plant in flower on the river Surura, a tributary of the Pomeroon.

[‡] This remarkable reed, it seems, is only to be found in the mountains of Mashiatti, Marawacea, and Wanaga, on the rivers Ventuari, Paramu, and Orinoco. I was so fortunate as to be the first botanist who saw it in its natural locality, and Mr. Bennett has been so good as to describe it under the name of *Arundinaria Schomburgkii.* (See *Annals of Natural History*, vol. v., p. 44.)

During my third expedition in 1837, while at Pirara, the Macusi village, which, as already observed, is the classical soil of Raleigh's and Keymis's *El Dorado*, I ascertained that an Indian lived in the vicinity who was far-famed for the preparation of the urari poison; and having won him by a handsome present, he promised to prepare it in my presence. I accompanied him myself to the Canuku mountains, a journey of two days, to be present, for surety sake, at the gathering of the plant, the *Strychnos toxifera*, the bark of which was stripped, and preserved in small baskets made for that purpose. I took possession, as my share, of three of these baskets, which I carried with me to Pirara, but when the appointed day for commencing the preparation had arrived, the Macusi, prevailed upon by one of the chiefs of his tribe, refused to comply with his promise. I was then so near my departure for Fort San Joaquim, on the Rio Branco, that I was prevented from engaging a more willing concocter, and with the pure bark, gathered in my presence, in my possession, I left for my destination. It was during my stay at that fort that I resolved to make some experiments *how far the pure bark of the urari plant* (Strychnos toxifera), *unmixed with any other substance, might prove fatal to animal life.* I took, therefore, two pounds of the bark shavings, pounded them, and having poured a gallon of water on the mass, allowed it to remain in that state for twenty-four hours. Half of it was filtered off, and keeping a steady but gentle coal fire, it was boiled in a new pot, adding from time to time more of the infusion. After having concentrated it by boiling to the consistence of very thin syrup, and having allowed it to cool, two arrows were poisoned with this substance, with which two fowls were slightly wounded, one in the thigh and the other in the neck. The effects became apparent after five minutes—the first died in twenty-seven minutes after the wound had been inflicted, and the other, which had been wounded in the neck, after twenty-eight.

The gentlemen who accompanied me on my expedition,* and Senhor Pedro Ayres, a scientific person who had been sent by the commander of the district to welcome me at the Brazilian boundary, were present during these experiments, which established beyond doubt *that the pure concentrated juice of the urari plant alone, without any assistance of Indian charlatanism or the addition of extraneous substances, proves fatal to animal life, if its juice, thus concentrated, be brought in contact with the blood.*

The boiling process was finished in less than seven hours, while the Indians employ more than forty-eight hours for that purpose; and as it required a period rather longer to produce death in the fowls wounded with it than would have been necessary with good urari, this must be ascribed to my decoction not being sufficiently concentrated. The poison which I had thus prepared was of a yellow-brownish colour—good Macusi poison is greenish-black, or even jet black; and I have no doubt that it receives this appearance from one of the ingredients which the Indians add to it.

When I left Pirara, foiled in my purpose to see the poison prepared by the Macusi, I arranged with the late Rev. Thomas Youd, who laboured then as missionary of the Episcopalian church in that village, to try if he could induce this famed poison-maker to boil it in his presence, in which he fully succeeded, and he had the goodness to communicate the result to me in a letter, which is printed *in extenso* in my paper on the urari in the *Annals of Natural History*, vol. vii., p. 416. It is the most authentic document of the manner in which the poison is prepared, for I have since witnessed its manufacture myself. Snakes' teeth, stinging ants, or any other animal matter, are not added to the mass. The urari bark alone is the ingredient which gives the active principle, and the other additions probably the consistence and colour. The herbs, the juice of which is added to the true urari bark, were, as far as I was able to ascertain their botanical character, *Strychnos cogens*, Benth., a species of *Cissus*, a plant belonging to the family of *Xanthoxylaceæ*, but the rest I could not recognize. The *cissus* no doubt contributes to give consistence to the concoction. It deserves the passing remark, that all the ingredients which the Macusi use (excepting the *Cissus*) for the preparation of their poison are of an intense bitter.

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* Amongst whom was Mr. John Morrison, as artist (who occupied recently the post as mayor of George Town, in Demerara); Mr. Vieth, as assistant naturalist; and Mr. Le Breton, to look after the commissariat.

The sagacity of the Macusi to try whether the poison he has prepared is of the strength he desires, by wounding a lizard, a cold-blooded animal,[*] shows much more philosophy than as related by Father Gumilla, that an Indian wounds himself slightly, and an arrow dipped in the poison is held near the wound. If it make the blood return to the vessels, although not brought into contact with it, the poison is considered to be of sufficient strength. The absurdity of such an experiment requires no comment; on the contrary, the experiment of the Indian is sagacious, for he believes that the urari has less effect upon cold-blooded animals than upon those with warm blood. Its effect is more or less sudden upon different animals, and the Indians say that monkeys and jaguars are more easily killed with it than any other animal. If it has a sudden effect upon a cold-blooded animal, for example, upon a lizard, a frog, or a snake, the preparation, as I have already mentioned, is considered excellent, and against such poison the Indians say there is no remedy. Salt and sugar are considered antidotes against weak poison, but will avail nothing where the poison is strong. It has been related to me, that when wounded in wars, and salt is not to be had, the Indian resorts to urine. The thirst which follows is described as almost intolerable, and certain death ensues if the thirst is quenched with water, for, the more the wounded person drinks, the greater becomes his thirst. This agrees with what Raleigh observed in this respect nearly two centuries and a half ago.

According to the researches of M. Alvaro Reynoso, chlorine and bromine neutralize the effect of the poison completely; and iodine, azotic acid, and potassa, alter it without destroying completely its effect.[†] If this discovery be confirmed by experiments with the best Macusi poison, which I do not think M. Reynoso employed, it will be an invaluable discovery.

I have endeavoured in the preceding remarks to give a general outline of what was known of the famous arrow poison, when I published my remarks in the *Annals of Natural History*, establishing at that time, without contradiction, by my experiments at Fort San Joaquim, that the principle which destroys animal life by urari is derived from the *Strychnos toxifera*, and that the poison, prepared by the Macusis, which is considered the best and strongest in South America, does not contain snakes' teeth, stinging ants, or any other animal substance.

My brother, Richard Schomburgk, who accompanied me in my travels during 1840 to 1844, at the command of the King of Prussia (the Prussian Government having previously obtained the permission from Her Britannic Majesty's Government), had in 1842 the opportunity of witnessing the preparation of the poison by the same individual who was to make it in my presence, ultimately refusing to do so, but who was more complacent to the missionary, Mr. Youd. The process, as described by my brother,[‡] is identical with that mentioned in the letter of Mr. Youd, dated the 4th of October, 1838, which I have added as a valuable document to my remarks on the urari poison in the *Annals of Natural History*.[§]

On his return to Berlin, he took with him some of the poison which had been prepared in his presence, which Dr. Heintz, of Berlin, has analysed.

The difficulties of this process, as regards vegetable substances, and the patience requisite to perform it with accuracy, are too well known. I have given samples of the true Macusi urari to some of the first chemists of our day, but it seems all shrunk from the labour, or really found difficulties which deterred them to continue the process. Dr. Heintz did not meet with perfect success. It is the most recent analysis of the urari poison, proving, like Boussingault's, the absence of strychnine and of animal substances. Dr. Heintz did not succeed in discovering the alkaloid which MM. Boussingault and Roulin have called curarine, and which MM. Pelletier and Petroz assert they have likewise obtained by a process which differs from that of the chemists just before named.[||]

Some very valuable experiments respecting the effects of the poison were made by Dr. Virchow and Dr. Münter, a statement of which is added in a note to my brother's work.

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[*] Compare Mr. Youd's letter in the *Annals of Natural History*, vol. vii., p. 418.

[†] *Journal de Pharmacie et de Chimie*, tome xxx., p. 151. See likewise *Traité de Chimie Générale*, par Pelouze et Freny, vol. iv., p. 452.

[‡] *Reisen in Brittish Guiana in den Jahren* 1840—1844, *im Auftrag Sr. Majestät des Königs von Preussen, ausgefichrt von Richard Schomburgk*. Leipzig, 1847. T. i., p. 450.

[§] *L. c.*, vol. vii., p. 416.

[||] *Traité de Chimie Générale*, par Pelouze et Freny, vol. iv., p. 451. *Traité de Chimie Organique*, par Liebig. Edition française, par Gerhardt, p. 365.

The most important result of these experiments is the observation that animals killed by urari show no difference in the appearance of the vital organs on dissection from those which were killed by mechanical means.

With the knowledge of the foregoing facts before me, I have been rather astonished to see the old account of snakes' teeth, &c., renewed in an article, entitled "*Recherches sur le Curare*," which, according to the *Journal de Pharmacie et de Chimie* (tome xix., p. 36), has been read at the Academie des Sciences, by M. Cl. Bernard, in his name, and in that of M. Pelouze.

These gentlemen assert, furthermore, that notwithstanding this poison had been known for such a length of time, no precise notice existed of the nature of the ingredients which entered into its composition.

I thought that the experiments which I had made at Fort San Joaquim would at least have set the question of the source of the active principle at rest.

MM. Cl. Bernard and Pelouze, on opening the animals poisoned by the curare, with which they experimented, found the blood always black, difficult to coagulate, and no longer "rutilant," by coming in contact with the air.

These observations, as far as it regards the state of the blood of animals killed by the curare, are entirely opposed to those of Virchow and Münter, who expressly state that after empoisonment with urari, the coagulation of the blood occurs just in the same manner as in animals killed by mechanical means. On dissecting a rabbit killed with urari, at the moment that the beating of the heart was no longer sensible, it showed nowhere any accumulation of blood, neither in the smaller nor in the larger veins.

The blood procured from the heart itself was quite fluid, without change in its colour, coagulating in a few minutes, just like the blood from slaughtered animals.

These appearances are perfectly in accordance with the investigations which were carried on, as stated in the *Annals of Natural History* (l. c., p. 423), by Dr. Franz, Mr. Sewell, the well-known veterinary surgeon of London, and Mr. Desenis of Berlin. The healthy appearance of the vital organs and of the blood after the empoisonment, induced me to observe, that with regard to medical jurisprudence this poison proved to be the more dangerous, as, should it be employed for sinister purposes by man against his fellow-creature, it would be difficult to state at a *post-mortem* examination the real cause of death. In some of the rabbits on which I tried experiments while in London, Dr. Franz found rather a larger quantity of blood in the brain and the spinal cord than usual.

MM. Bernard and Pelouze make the very important observation, that having applied the poison to the pulmonary mucous membrane, it had the same effect by absorption as if it had been brought in contact by incision with the cellular tissue.

Does this not agree with the observation made by Virchow and Münter, that death occurs not so much as a direct result of the empoisonment, but as the consequence of the interrupted respiratory movement?

The *Journal de Pharmacie et de Chimie* for August last contains a report by M. Reveil, to the Société de Pharmacie of Paris, of the Pharmaceutical Substances at the Universal Exhibition. M. Reveil makes some further interesting observations on the arrow poison; nevertheless, they are mixed with the old superstitious accounts of its preparation and effect. M. Reveil quotes the statement of M. Boussingault, made before the Académie des Sciences, that the curare which he brought with him from the Amazon did not contain any snake poison.

He repeats former observations, that the action of the curare had great analogy with the venom of snakes; for example, it might be taken innocuously into the stomach, but in other points it differed from it, for the curare did not produce an inflammation of the wound, which, if caused by snake poison, produces almost instantaneously considerable inflammation.

His statement that the curare may be taken inwardly, or received in the stomach without danger, has hitherto been the adopted opinion. I have mentioned already, in the *Annals of Natural History*,* that, while suffering under a tertian ague, during my first expedition in the interior of Guiana, and our quinine having fallen short, I took the urari poison in small doses inwardly. Humboldt relates that the Indians considered it an excellent stomachic,* but as I found that it did not remove my fever, and my friend and travelling companion, the late Capt. Haining, having warned me repeatedly against this practice, I desisted.

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* *L. c.*, vol. vii., p. 425.

Some years afterwards my brother, Otto Schomburgk, made at Berlin several experiments with the urari poison. Amongst others was the following: He administered to two cats the urari in like quantities, to the first by incision, to the other inwardly by the mouth ; to a third he applied by incision a like quantity of strychnia. The convulsions caused by having placed the urari to the incised wound, stood not in comparison to the tetanus and trismus produced by the strychnia. The former exhibited much more a gradually falling asleep than violent convulsive affections.

The cat, in the wound of which urari poison had been introduced, died after eleven minutes ; the other, poisoned by strychnia, after twelve minutes ; and the one to which the poison had been administered inwardly, in seventeen minutes.

The death of the latter took place under the same symptoms as produced by bringing the poison in contact with the blood. On dissecting the animal, the stomach and the duodenum were found in their whole extent coloured with the poison. He could not discover a wound in either of the organs conducting to the stomach, or in that part itself.†

In order to substantiate the result, which my brother obtained by giving the poison inwardly, it requires numerous repetitions.

The cat may have had some excoriation, if not exactly a wound, by which the blood came in contact with the poison. It is, however, sufficient to caution against the internal use of urari in its concentrated state. But it is well known that with such poison, more or less weakened, the Indians mostly kill their game. This refers to the thick-skinned tapir, to the fleet deer, the agile monkey, as well as to the largest or the smallest bird. Even the wild cattle which roam over the savannahs of Pirara and Fort San Joaquim are secured in that way. Without that, the meat of the animals thus killed prove injurious to those who partake of it. On the contrary, the employment of urari in killing the animal renders the meat more tender ; and following the example of Father Zea, the missionary who accompanied Humboldt up the Orinoco, we killed, during the Guiana expedition, the fowls which we purchased from the Indians, and which usually were uncommonly tough, by means of a poisoned arrow, rendering thereby the flesh more tender.

I must not omit to mention the experiments made by Mr. Sewell, who, viewing the lock-jaw in horses as the result of irritation, conjectured that if a horse in tetanus were poisoned by urari, which acts by suppressing nervous power, and life was then to be restored by artificial respiration, the nervous system, on reanimation taking place, might possibly be free of the original morbid irritation. Reasoning thus, Mr. Sewell tried the following experiment :—A horse suffering from tetanus and lock-jaw, the mouth being too firmly closed to admit the introduction of either food or medicine, was inoculated on the fleshy part of the shoulder with an arrow-point coated with urari poison. In ten minutes apparent death was produced. Artificial respiration was immediately commenced, and kept up for four hours, when reanimation took place ; the animal rose up, apparently perfectly recovered, and eagerly partook of hay and corn. He unluckily was too abundantly supplied with food during the night. The consequence was, over-distention of stomach, of which the animal died the following day, without, however, having the slightest recurrence of tetanic symptoms.‡

Mr. Waterton conjectured that the application of urari poison might prove successful in cases of hydrophobia. However, the experiments of recovering animals which had been killed with urari by tracheotomy, have not always succeeded; indeed, only in the smaller number of cases.

It is therefore evident that the urari, in the present state of our knowledge of its ts, could only be resorted to in the greatest extremity as a remedy against ophobia, and under all circumstances, only where there is no other hope of very.

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* *Personal Narrative*, vol. v., part ii., p. 522.

† Richard Schomburgk's *Reisen*, vol. i., p. 456.

‡ I refer, likewise, to the interesting experiments carried on by Mr. Sewell, to recover, by artificial respiration, or tracheotomy, an ass which had been wounded with a poisoned spike. Mr. Waterton took the animal afterwards to Walton Hall, his seat, where, well cared for, it survived the operation twenty-five years. See Waterton's *Essays on Natural History*, 3rd edition, p. 304.

becomes, however, now a question of the greatest importance to society, should dangerous poison be employed for criminal purposes, how is it to be discovered such was employed? The wound by which good urari is communicated to the l shows no inflammation; nor is it necessary that it should be a large flesh-nd, an arrow with the finest point, or a needle coated with concentrated poison be sufficient to destroy life.

ew startling is the assertion of Dr. Heintz, that three milligrammes of the snous extractive matter which he obtained killed a rabbit in seven minutes!

nder such an aspect it is certainly of the greatest importance that our best nists should institute a more searching inquiry into the nature of the urari, how pplication may be discovered and its effects counteracted.

he assertion of Mr. Reynoso, that chlorine and bromine are antidotes, ought to ested by a series of experiments, not only with the best urari poison, but likewise xtracts obtained by scientific means from the bark of the *Strychnos toxifera* and r species of plants belonging to that genus.

many years have elapsed since I left British Guiana, that I scarcely know to m to apply to procure good Macusi urari, but I am persuaded, if those who wish ccupy themselves with such an interesting research, were to address themselves he Royal Agricultural and Commercial Society of British Guiana, or to Dr. r or Dr. Dalton at Demerara, their application would be successful, and that ul institution, or the scientific gentlemen just named, would exert themselves to ure the true Macusi poison.

mention it as of great importance to obtain, at the same time, the pure bark of *Strychnos toxifera*, in order to ascertain, by scientific investigations in Europe, the ve principle, which I am persuaded is contained in the *Strychnos toxifera* in the est degree, though other species of that genus may possess it more or less.

A fine chemical and physiological investigation remains to be accomplished in ope on the toxiques of the New World," stated Humboldt forty years ago. ortunately but little advance has since been made in that direction, and the same ortant desideratum remains still to be accomplished.

anto Domingo, January 20th, 1857.

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r. De Vry mentioned some experiments he had made with the urari poison, n which he concluded that it did not act as a poison when introduced into the nach. He had reason to believe that it became inert after being long kept.

r. Squire described a case in which almost instant death was produced in a bit by wounding it with an arrow charged with the poison.

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r. De Vry exhibited to the meeting an interesting collection of specimens of alkaloids of the cinchona barks, together with their compounds and some of ir derivatives.

PHYTOLOGICAL CLUB.

17, *Bloomsbury Square, March 11th*, 1857.

DANIEL HANBURY, F.L.S., IN THE CHAIR.

onations of plants were announced from Mr. Henry Groves, of Weymouth; l also from Mr. E. Wood, of Brighton.

he following paper was then read:—

ON THE FOSSIL VEGETATION OF THE COAL MEASURES.

BY MR. T. GREENISH.

he author commenced by referring to numerous specimens, for which he was in-ted to Mr. Woolven, of the fossil remains of calamites, lepidodendron, sigillaria, gmaria, and some beautifully marked ferns, which were found imbedded in the dstone and shale which constitute the roof and floor of our coal seams.

he author proceeded to state, these fossil remains serve as a means of illustrating the history of early vegetable life, and also the probable condition of climate which prevailed at that remote period, and favoured so luxurious a growth.

It is in the coal formation chiefly that the remains of plants have been preserved; deposited under conditions which prevented the usual process of decay, they have lain buried in beds of sand and mud, since become sandstone and shale.

If, from the fossil remains, which still retain the parent form, we were to arrive at the conclusion that they represent the plants which have contributed most to the formation of coal, we should most probably be in error. It by no means follows that the centre of a coal seam is composed of the same vegetation as that on which it lies, or by which it is covered, as indicated in the remains before us, other plants and those of a more delicate character, whose organization was incapable of withstanding the decomposing influences to which they were subjected, have, there can be little doubt, materially contributed to this formation.

In the bituminous shale we have the beautifully marked ferns in great abundance, many of them are now on the table, yet it is a question if they have furnished much material for the formation of coal.

Dr. Buckland states that the value to be attached to *numerical* proportions of fossil plants, in estimating the entire condition of the flora of these early periods, has been diminished by the result of some interesting experiments on the *durability* of plants immersed in water for a period of two years.

1. That the leaves and bark of most dicotyledonous plants are wholly decomposed in two years; the greater part of those which resist it are *coniferæ* and *cycadeæ*.
2. That monocotyledons are more capable of resisting the action of water, particularly palm and scitamineous plants, but the grasses and sedges perish.
3. That fungi, mosses, and all the lowest forms of vegetation disappear.
4. That ferns have a great power of resisting water if gathered in a green state, not one of those submitted to the experiment having disappeared, but that their *fructification* perished.

The general absence of structure in the interior of these large fossil remains of the coal formation implies the very durable nature of their bark as compared with the internal portion.

This fossil vegetation is found in all stages of transformation. Here is one of the sigillaria with a coating of friable coal, which has replaced the bark, while that portion immediately beneath still retains the form of the particular plant.

One of the specimens has several pieces of iron pyrites attached to it. This mineral is frequently found in the coal measures, either incrusting fossil shells, or as a coating on vegetable impressions in shale; its formation is at the cost of organic remains.

As regards the climate of this period, it is a generally received opinion that a tropical heat must have prevailed; but there are those who doubt it, finding it difficult to reconcile the preservation of so much vegetable matter with a high temperature. There is no doubt but that organic substances under water undergo oxidation by the absorbed atmospheric oxygen, and that it may go on at very great depths; yet it is undoubtedly the fact, that decomposition goes on more slowly the deeper they are below the surface, owing probably to the slower replacement at those depths of the oxygen consumed in their decay, and decomposition may assume different characters according as it takes place in water of greater or less depth.

“The great predominance of ferns would indicate moisture, and we know too little of the sigillaria, calamites, and other ferns peculiar to the carboniferous period to be able to speculate with confidence on the kind of climate they may have required.”

Having now glanced at the fossil remains which, imbedded in clay or bituminous shale, lie upon and underneath the great body of coal, I shall reserve for a future occasion the consideration of those plants of which probably the coal is composed, until I again visit the coal district of Ashton-under-Lyne, when I trust an opportunity will be afforded me of personally obtaining the specimens necessary to illustrate the subject, when I shall have much pleasure in bringing it again before you.

The next meeting of the Club will be held on Wednesday, April 8th, 1857, at half-past eight P.M., when an account of a botanical excursion to Lulworth, near Weymouth, by Mr. H. Groves, will be read and illustrated by specimens.

The Committee beg to direct attention to the following genera, of which the herbarium of reference is deficient. The Committee would be happy to give plants in exchange for any of the genus mentioned below :—

Thalictrum, Myosurus, Eranthis, Aquilegia, Aconitum, Pæonia, Nuphar, Papaver, Crambe, Isatis, Capsella, Hutchinsia, Cochlearia, Subularia, Camelina, Alyssum, Arabis, Barbarea, Sisymbrium, Cheiranthus, Hesperis, Brassica, Lychnis, Moenchia, Sagina, Honckeneja, Holosteum, Cerastium, Cherleria, Althæa, Lavatera, Spartium, Ulex, Medicago, Trigonella, Oxytropis, Arthrolobium, Onobrychis, Sibbaldia, Fragaria, Rubus, Rosa, Mespilus, Cratægus, Pyrus, Epilobium, Isnardia, Montia, Hydrocotyle, Astrantia, Physopermum, Smyrnium, Cicuta, Apium, Petroselinum, Trinia, Sison, Œgopodium, Carum, Fœniculum, Seseli, Ligusticum, Silaus, Meum, Crithmum, Angelica, Peucedanum, Tordylium, Caucalis, Scandix, Anthriscus, Coriandum, Lonicera Linnaea, Rubia, Centranthus, Tragopogon, Helminthia, Picris, Thrincia, Apargia, Hypochœris, Lactuca, Sonchus, Mulgedium, Borkhausia, Taraxicum, Saussurea, Chrysocoma, Aster, Cineraria, Bellis, Matricaria, Wahlenbergia, Azalea, Andromeda, Arbutus.

The remainder of the list will appear next month.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Thursday, 26th February, 1857.

MR. H. S. EVANS, VICE-PRESIDENT, IN THE CHAIR.

MR. NEWTON SAMUELSON, F.C.S., read the paper for the evening :—

ON THE PRODUCTION OF COPPER FROM ITS ORES.—PREPARATION AND USES OF SALTS OF COPPER EMPLOYED IN THE ARTS AND SCIENCES.—THE MODES OF ASSAYING COPPER ORES IN THE DRY WAY, AS WELL AS BY HUMID ANALYSIS.

AFTER giving a short history of the metal, the lecturer proceeded to describe the various methods by which it is derived from the ore; exhibiting and explaining large drawings of the smelting furnaces used for that purpose. He then passed on to the salts of copper, viz., sulphate, or blue vitriol; carbonate, or verditer; arseniates (Scheele's and Schweinfurth's green), and the various acetates; explaining their manufacture, the sources from whence they are taken, and their uses. After this the alloys of copper were touched upon by Mr. Samuelson, namely, brass, German silver, bronzes, &c.; and, lastly, he described, at considerable length, the means used by assayers and analytical chemists to test the strength of copper ores, both by smelting and by humid analysis. This part of his subject Mr. Samuelson rendered remarkably clear by practical experiments, showing, without the slightest reserve, the means which he himself employed in ascertaining the strength and quality of copper ores.

At the close of the lecture a long discussion ensued on several of the points touched upon, and a vote of thanks was accorded to Mr. Samuelson for his highly interesting communication.

Thursday, 12th March, 1857.

MR. ABRAHAM, THE PRESIDENT, IN THE CHAIR.

Mr. E. G. Heaton was elected a Member of the Society.

The SECRETARY announced donations to the Museum from Messrs. R. Sumner and Co., and Mr. W. H. Samuel.

A paper, of which the following is an abstract, was then read by Mr. THOS. LOWE,

ON THE SALE OF POISONS.

HE commenced by stating that, after an attentive consideration of all the *pros* and *cons* that had hitherto appeared on the subject, he had come to the conclusion that legislative interference with the sale of poisons both had done good, and would, if extended, do more good, provided it were not too stringent. But though advocating the extension in principle of the Arsenic Act to such substances as strychnia, prussic acid, and a number of other poisons, including specially oil of vitriol and laudanum, and adding thereto a system of certificates and licenses, he repudiated the idea of throwing the whole burden of trouble and responsibility upon the Medical Profession; his brethren, he was sure, would take a fair share of both. He urged, that to confine legislation to the prevention of criminal poisoning, as some would do, was, if not useless, beginning at the wrong end. *Accident* by poison was what we ought to strive to prevent, and, in so doing, we should lessen the number of those criminal attempts which were meant to be sheltered under the appearance of accident. It was so in all analogous legislation. Who ever heard, that in ordering dangerous machinery to be fenced off, or a bridge to be walled, it was done in order that a man might not force his neighbour over the barrier? What interest had the Pharmaceutist in opposing such a scheme? None that he could see: for it was notorious that cases of mistake in which blame could be justly imputed to the Chemist were very few indeed. The careful Chemist habitually complied already with most of the provisoes of such an enactment as he proposed, and would scarcely be made aware in his practice of its having passed the Legislature, whilst it would be a wholesome terror to the careless; and of those who might be so called, few, if any, properly belonged to the Pharmaceutical body. He said this with confidence. The more you "figured" and studied statistics, the greater—in this age of "free trade," in poisons especially—the marvel grew, that instances of carelessness and error in a class so numerous were so extremely rare. But in admitting and glorying in this, he had not said that cases of *poisoning* were so few. In England they averaged over five hundred deaths per annum judicially cognized. How many instances falling short of death, or of undiscovered deaths, there were, it would be vain to conjecture. It was mistakes of all kinds, and wherever occurring, that he aimed to prevent by legislation. (Having answered at length the question, Why legislate for *poisons*, when you don't dream of such a thing in the case of knives and razors, ropes, pistols, &c., Mr. L. proceeded). Here you do not aggravate the mischief, and set a premium, as it were, on other modes of destruction; for the man who employs poison, is the wretch who dares not use the knife or the bludgeon. Take poison from him, and he is, probably, weaponless. Passing over as dangerous, and therefore useless, all reliance upon variously-shaped bottles and coloured labels, and coinciding in the opinion that no available definition of a poison could be given, the lecturer proceeded to unfold his plan, which, whether effected by enlarging the powers of the Pharmaceutical Society to the extent required, as he would prefer it should be, or otherwise, was this:—He would publish alongside of the Pharmacopœia, and like it, to be from time to time revised, a kind of national "Toxicopœia," in the shape of a schedule of poisons, with instructions, &c., bearing a somewhat similar relationship to the domestic offices that the former does to the sick-room. Take the following as samples of "formulæ" for promiscuous sale to servants, &c., for common cleaning and other purposes:—Sulphuric acid, Oj.; Water, Oiv. or Ov. To be called "Vitriolic" Acid:—℞ Acid. Oxalic, q. p.; Aquæ ad solutionem; Ess. Odorif. ad "Methyl"-ationem; but in English, of course. As oil of vitriol is never used except diluted, nor oxalic acid except dissolved, what hinders their being diluted and dissolved, and only so kept for such purposes? Oxalate of potass he would forbid to be called in print "Salt of Lemons," and he would scent it. Almond flavour should have a defined strength. A label of "Poison" should be invariably affixed, and no liquid amongst the number be sent out in a cup or open vessel.

Of such a schedule as this, he proposed to classify the "Materia Toxicaria" thus: Poisons to be sold only in the presence of witnesses, and these to be required only when the article is asked for on the plea of being wanted to poison vermin or other animals. Poisons to require the presenting a certificate, each separate time of demand; and poisons to require one once only, as a general rule. He also divided the certifiers into classes. All duly qualified medical men, veterinary surgeons, scientific professors, and the whole body of wholesale, manufacturing, and retail Chemists and Druggists, duly licensed and registered, to compose the first. The second to comprise manufacturers, dyers, &c., to be privileged to recommend each other for the supply of chemicals used by them, in not less than certain defined quantities. And, third, all respectable householders, known to the supplying Chemist. These conditions, with one exception, to apply to strangers only.

Under such a system as this, even though uninvested with a shred of power in the Executive to enforce its strict observance, he maintained that, from the influence of public opinion acting upon the applicant for poison, and from the moral force of law upon the conscience of the vendor, a great and immediate change for the better would be effected. How else is it that the Pharmacopœia is observed? Who enforces strict adherence to it? No difficulty whatever would be experienced in obtaining poisonous articles for experimental, scientific, manufacturing, or trading purposes. The only doubt of success was in reference to laudanum, solutions of morphia, and a few other medicines; and surely by allowing—even to perfect strangers—a range of latitude vastly wider than the elective franchise, this difficulty was in great part met, if not entirely overcome. The Druggist should file the certificates, and in ninety-nine cases out of a hundred he would only require to be reminded of having done so.

Mr. L. likewise pointed out and dwelt upon numerous other beneficial results, as he considered them, as likely, if not certain, to arise.

An interesting discussion followed the reading of the paper, in which the Chairman, Mr. Mackinlay, Dr. Edwards, Mr. Mercer, and other members took part. The general feeling seemed to be, that, although an extension of the Arsenic Act might be beneficial, the best safeguard for the public is the proper qualification of the persons who deal in poisons, and the intelligence and discretion they exercise in selling them.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE AMOMA OF WESTERN AFRICA.

BY W. F. DANIELL, M.D., F.L.S.,
Honorary Member of the Pharmaceutical Society.

(*Concluded from page* 472.)

4. Amomum *Danielli.* Hook. fil.

(*The Yellow Amomum.*)

A. Danielli. *Hook. fil. in Journ. Bot., v.* iv., *p.* 129, *tab.* 5 (*sub. nom*· A. Afzelii).

A. Danielli. *Hook.* (v. β. purpureum) *Bot. Mag., t.* 4764.

Bastard Melligetta. *Pereira, El. Materia Med. ed., 3rd, vol.* 2, *p.* 1138, *fig.* 250, 251, 252.

Guibourt, Hist. Nat. des Drogues Simples, t. 2, *p.* 220, *fig.* 121.

Zingiber Meleguetta. *Gærtner de fruct., v.* 1, *p.* 34, *t.* 12, *fig.* 1. (?)

Fructus Cajeputi. *Trew, Commercium literarium,* 1737, *tab.* 2, *fig.* 5, 6, 7, 8, *p.* 164. (?)

Var. β. purpureum. *Labellum* angustum, pendulum. Flore purpureo, anthera apice truncata. *Hook. fil., in Journ. Bot., vol.* vi., *p.* 294. This variety was cultivated at Kew from seeds gathered at Fernando Po, or St. Thomas's islands. The plant had golden yellow flowers, which appear, however, to become changed by artificial culture into red purplish, with yellow on the lip and filament. It differs only from the ordinary species by the apex of the anther being truncated.*

This *Amomum* is very common in many of the maritime and inland districts of Western Africa. It is mentioned by Afzelius, in his report on the natural productions of Sierra Leone, under the name of *Massa-aba*, with the remark that the seeds resembled those of *Mabubu*, but were smaller; and that the pulp, when fresh, was of a fine acid. No description of this plant has been given in his *Remedia Guineensia.* It is extensively diffused throughout the peninsula of Sierra Leone, and is equally abundant in several of the circumjacent countries. A few varieties are also to be met with on the Gold and Slave Coasts, in Old Calabar, Camaroons and Gaboon rivers, on the islands of Fernando Po, Prince's, and St. Thomas's, in the Gulf of Guinea, and in other coastal districts southward of the equator.

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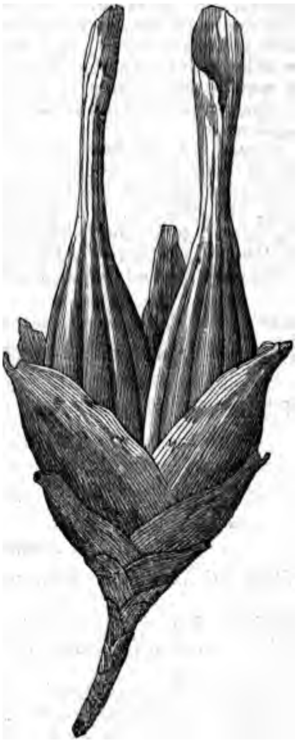
* Vide *Pharm. Journ.*, vol. xii., p. 72.

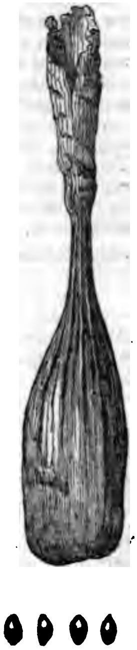
The characteristic yellow flowers, with their orchidaceous aspect, will alone suffice to distinguish this from the other African *Amoma*. The Timneh populations designate it *Massa-aba*, and the natives of Yorruba by that of *Obro-wawa*, or *corn-leaved Obro*, from the leaves being considered to resemble those of the *Zea Mays*, L. The plant differs more or less in development according to the elevation at which it exists. In mountainous localities the reduction in size is considerable, when contrasted with the same plant when flourishing in a swampy situation. In the former the stems are thin and slender, and barely attain four or five feet in altitude. The lanceolate-acuminate leaves are not so broad, of a paler green, and proportionately restricted in growth. The flowers are smaller, less crisp, but preserve their color and other distinctive characters. The fruit, produced in numerous clusters on short aggregate scapes, is variable in size and superficially furrowed by 12—14 longitudinal depressions which deepen near the apex. The capsules about 2—2½ inches long, 6—8 lines broad, are oblong ovate, striated, obtusely triangular, and when dry somewhat arched and of an orange or ruddy brown color. The seeds are deep brown, ovate or spheroidal, polished with a small prominent yellow scar or hilum. They afford a weak camphoraceous flavor, but are more frequently, tasteless (figs. 7 and 8).

Fig. 7.



Amomum Danielli. (Alpine variety. Fruits of natural size.)

Fig. 8.



(Dried capsule, and seeds of ditto.)

In the latter, or Fernando Po variety, the stem exceeds an inch in thickness and ten or twelve feet in elevation, while the leaves, very distinctly striated by nerves, sometimes exceed two feet in length, and are proportionately broad. The scape is also considerably longer. The fruit is round or broadly ovate prior to exsiccation, has a plumper outline, being much greater in magnitude, and less ribbed. The capsule when dry is about three to five inches in height, becomes slightly triangular, narrow and tapering (owing to the dissipation of its fluid contents), and the apex terminated by a cup-like expansion, the remains of the calyx. The seeds not constant in size, average two lines long and a line broad, are oblong-cylindrical, or obovate, dark brown highly polished, occasionally curved, and like those of the other African *Amoma*, are enclosed in a fine membrane from the pulp, which is pleasantly acidulous. They are endowed with a peculiar terebinthinate taste, variable in pungency. The flowers golden yellow, are firm, crisp, and emit a delicate fragrance. They appear in May and June. The aborigines of Fernando Po affirm that only two *Amomums* abound on the island, viz., the *Tokolo m'pomah* (*A. Granum Paradisi*), and this species termed

Barsalo, the latter of which flourishes so abundantly on the Kroo suburb of Clarence and on the mountain acclivities, as to form in some places almost impassable thickets. Whether the natives comprehend under their designation of *Barsalo* other scitamineous plants, I am unable to state.

In the Islands of Prince's and St. Thomas's these fruits are sold in the markets, and are known by the name of *Uçame* or *Ussahme*. At St. Anna de Chaves, the capital of the latter, I purchased several hundred for a few pence. These capsules were, however, much broader, triangular, and partially resembled those of the *Amomum Clusii*, Sm. Their terebinthinate flavor was also stronger, but in other respects appeared to be in conformity with the preceding. As this species is said to flourish in the Gaboon and Corisco rivers, it may probably be the same to which Bowdich thus makes allusion: "A beautiful red pod, the blossom of which was out of season, contains small black seeds, in taste exactly resembling the cardamom. The natives of this place (Gaboon) and also of the interior, are very fond of them. In Booroom the plant is called *Booroomum*, at Gaboon, *Entoöndo*."*

An examination of the fruits of the *A. Clusii*, Sm., in the museum of the late Dr. Pereira, lead me to suspect that they are the produce of some species either from oriental Africa or Madagascar. The capsule is rounder, deeply striated, more coriaceous, with thicker walls, and a less tapering or elongated point, and of a deep red color, characters which do not well agree with *A. Danielli*, although the seeds are nearly alike. So far as my experience extends, no fruit similar to the *A. Clusii* has been found in Western Africa.

The shape of the capsule and seeds of Trew's, "*fructus Cajeputi*" indicate some affinity to one of these species; it is, however, not improbable, that they belong to an East African or Indian plant at present undetermined. They certainly are not identical with the *A. Macrospermum*, Sm., nor yet with the "*Banda cardamom*" of Martius.

By the negro races of Guinea the pulp of the *A. Danielli* is eaten with avidity, for the agreeable acid it contains, the refrigerant qualities of which are used to mitigate the thirst from fever and other causes. The women and children of the Timneh and Soosu countries often wander in the woods in search of the ripe capsules, both for edible purposes and as an ingredient for some of their medicinal decoctions. The roots and entire plant also comprise one, among other substances resorted to in the treatment of diseases. I have found several of these pulps when broken up and placed in a jar of water, impart a grateful acidity to the fluid, which appears to be better adapted for an ordinary beverage in endemic maladies, than the lemonade made from lime-juice and sugar, which is apt to disorder the stomach and bowels.

5. Amomum *Palustre*. Afzelius.

(*The Swamp or water Amomum.*)

A. Palustre. *Afzelius. Stirpium in Guinea Medicinalium*, No. 1, p. 9.
A. Strobilaceum. *Smith in Rees' Cycl. vol.* 39, *addenda.*
A. Cereum. *Hook. fil.* (flores) *in Journ. Bot. v.* vi. *p.* 296.
Pereira. El. Mat. Med. ed. 3rd. *vol.* 2. *p.* 1139 (Species ex Gambia).

Scapis longiusculis, fructu oblongo altero latere subcompresso, foliis lato-lanceolatis. *Timmenensibus*, Masengbáni, *Bullomensibus* Cumbulu.

Floret a Januario usque ad Junium. *Crescit* in locis paludosis *Sierræ Leone*, litoris *Bullomensis* et in vicinitate urbis Susuensium *Tuki-Kerren* prope flumen Pongas dictum. *Stirps* quod ad omnes suas partes glabra. *Radix* ut in *Zingibere officinali*, crassa, radiculis filiformibus longissimis instructa et unicum plerumque ferens caulem, sub cujus basi provenientes Scapi surgunt vix nisi duo-oppositi, et ex ætate inæquales. *Caulis* altitudine fere hominis, sed crassitudine solum digiti, sterilis, simplex, basi vix vel parum tumidus, strictus,

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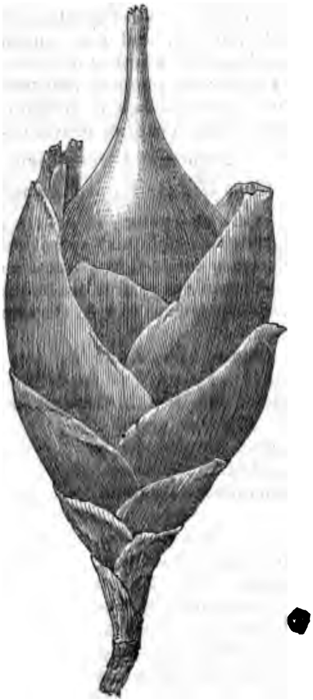
* *Bowdich's, Mission to Ashante*, p. 446.

teres, ex vaginis compositus arcte appressis, superioribus foliiferis. *Folia* longitudine dodrantalia, latitudine pollicaria superque, atque adeo lato lanceolata dicenda, disticho-alterna, distantia, brevissime petiolata, basi inæqualia, reclinata, longe acuminata, utrimque lineata, supra saturate viridia, subtus carinata, pallidissima. *Scapi* 3—4 pollicares, erecti vaginis magnis sursum increscentibus truncato-mucronatis fuscis imbricate et penitus vestiti apice 2—4 flori. *Flores* aggregati, spathis lanceolatis, communi bivalvi coriacea, propriis univalvibus membranaceis instructi. *Corolla* monopetala, tubo longo angusto intra vaginas Scapi superiores et spathas florum toto recondito, alba inodora quinquepartita: *laciniis* tribus exterioribus, quarum anterior major oblonga, sub emarginata, laterales minores lanceolata obtusiusculæ: duabus interioribus, quarum una maxima nitidissima, a basi supra medium per longitudinem cerea, ceterum nivea margine undulata, apice crenulata et altera parva loco Filimenti angusta, in sinu laciniæ exteriarum majoris prorsus occultata, ad basim apendicibus duabus erectis linearibus instructa, in medio lato-linearis compressa, ad apicem excurrens in duo cornua lineari introrsum versa rubicunda, et infra illa in duos dentes approximatos subulatos, apice conniventes et introrsum deorsumque flexos. *Filamentum* nullum nisi pro eo sumere velis, quam supra nominavimus, parvam illam ex interioribus Corollæ laciniam. *Anthera* unica in duos divisa lobos, quorum quisque affixus est margini interiori cujusque ex duobus dentibus infra apicem laciniæ corollinæ parvæ enatis. *Stylus* longus filiformis hyalinus, basin dentium antheriferorum attingens. *Stigma* magnum compresso-campanulatum, inter lobos antheræ et supra illos protensum in medio materia gossypina repletum, alias vacuum margine integro, album rubro colore aliquantulum tinctum. *Capsula* vaginis spathisque remanentibus magnis fuscis adeo tecta, ut nisi illis remotis videri nequeat, bipollicaris et supra, oblonga acuta: rostro longo materia spongiosa albissima repleto, trilocularis, roseo-coccinea. *Loculamenta* compressa separabilia, singula circumdata materiâ fere citrina elegantissime crystallina subpellucida, ope filorum in duas series dispositorum affixa columnæ centrali membranaceæ albissimæ tri-alatæ: alis loculamenta dividentibus et ad corum extremitatem extensis. *Semina* angulata acuminata rugosa aterrima nitida basi glauco-albida (*Afzelius ubi sup.*).

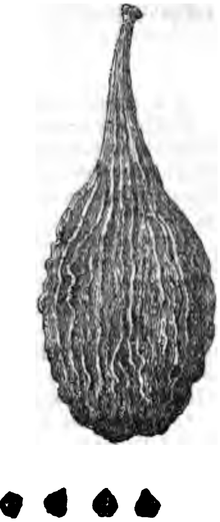
In consequence of this and another species growing blended together in the same locality, both were sent to Dr. Hooker under one name, and hence the flowers of this became united with the leaves and fruit of the succeeding *Amomum*. The native collectors aver that they belong to the same plant, but subsequent investigations have satisfied me that these fragments pertain to two distinct species. The *Amomum palustre* is usually limited to the swampy lowlands or margins of lagoons, and is therefore abundant on the banks of several streams that flow through the Foulah, Soosu, and Timneh countries. It is also to be found in the marshy grounds at Koto, near Cape St. Mary, in the Gambia, and is asserted to be indigenous to the rivers Casamanca, Pongas, Sherbro, and to many of the maritime regions so far south as Cape Palmas. In Sierra Leone this species is comparatively scarce, and with difficulty can be procured from the wooded ravines beyond Regent and the Sugar-loaf mountain. The vernacular title among the Mandingo's is *Parlancunpon*, the Timneh's, *Massa-egbané*, and the Soosu's, *Kunbulu*. In beauty and delicacy of florescence, it surpasses every African *Amomum* at present known. The plant is of moderate elevation, the stem seldom attaining six feet in height. The leaves briefly petiolate, are singularly unequal at their base, broad-lanceolate, and sharply acuminate. The flowers are inodorous, of a pure and waxy whiteness, with the lower portions of the corolla golden yellow, and the superior margin of the anther and filament of a rich pink. In some situations the flowers are pervaded by a faint pinkness. The bracts or scales are of a deep red color. The fruits, either single or conjugate, are surmounted on short scaly scapes. Their magnitude apparently depends on local influences. In length they average about 2—2½ inches, and 1½ in breadth at their base.

FIG. 9.



Amomum Palustre.
(Fruit of natural size).

FIG. 10.



A. Palustre.
(Dried capsule and seeds).

They are, however, sometimes met with, barely an inch long, and 4—5 lines broad. When mature the pericarp is thin, smooth, and of a fine reddish pink. In shape they somewhat resemble a carboy, broad decanter, or water cooler, being round and wide at their base, but suddenly contracting into a long narrow apex or neck (fig. 9). In the dry state the capsule is variable in form, becomes irregularly wrinkled by longitudinal striæ, is more or less coriaceous, and almost hidden by the surrounding bracteæ. Its proportions are also less rotund, being semicircular or obtusely triangular, while the apex, more attenuated and sharply beaked, is crowned by a small tubercular expansion (fig. 10). The pulp, like the preceding, is divided into three equal parts, and is not acid, at least in the Sierra Leone species that came under my notice. The seeds are grey or leaden-colored, angular, with a remarkably large and fleshy pale yellow tubercle at the base (hilum), which in a dried condition becomes either more or less concave or pointed, and of an orange or pale yellow hue. Both capsules and seeds are highly aromatic, the latter in particular being endowed with a rich spicy flavor analogous to that of coriander.

The *Amomum* belonging to the Gambia alluded to by Pereira[*] is either a variety of this species, or another very closely related to it, probably the former as the general outline differs but slightly. The numerous sheathing bracts, that closely envelope, and almost conceal the contracted capsule, are common to both. The peculiar leaden hue of the seeds, the form of the fruit, and other characteristics of the plant indicate a near approach to identity. The only deviations observable in the Gambia specimens are in the fruit, which is larger, more ovate or oblong in shape and less beaked, the seeds are likewise plumper, smoother, and feebly aromatic, and the hilum is also less in size. Moreover the flowers are of pinkish white, and the pulp agreeably and moderately acidulous. The native authorities observe that this is the only *Amomum* found growing in the midst of morasses or stagnant waters. The Mandingo's and Feloops delight in sucking the fresh pulp.

The portions of this plant held mostly in requisition by the negro communities are the seeds, which are employed more as an article of perfumery, than of medicine.

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[*] *Ubi supr.*, p. 1189.

The Timneh women pulverise the fresh seeds between two stones, which after their reduction into a fine powder, they triturate with *Bamba-tulu* or *Donah* butter,* and anoint their bodies. Afzelius states that the powdered seeds are applied to the forehead, temples, and neck in pains of the head. It may, however, be considered doubtful whether this is their legitimate use, as the native doctors invariably prefer the pungent and peppery seeds of the *A. Granum Paradisi*, or *A. Excapum* for rubefaciant purposes, and they are in general tolerably plentiful in most of the localities previously mentioned.

Amomum *Pereirianum.*

(The slender-scaped Amomum.)

A. cereum, *Hook. fil.* (folia et fructus) *in Journ. Bot. v. vi. p.* 296.

Foliis lineari-lanceolatis (basi obliquis) apice longe acuminatis, ligula brevi truncata scapo gracili elongato sub-6-floro, bracteis appressis obtusis truncatisve cuspidatis, fructu lineari-lanceolato seminibus majusculis angulatis pulpa (sicco tenui) immersis, testa læte brunnea. An A. citratum, *Pereira*, *Mat. Med. v.* 2, *p.* 1137?

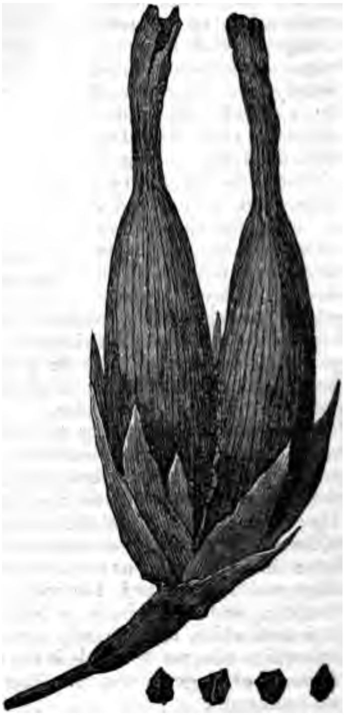
Hab. Regent, Sierra Leone. *Dr. Daniell.*

Folia 6—10 unc. longa, 1—1½ lata, basi superiore breviore in petiolum brevem decurrente. *Scapi* floriferi 4 unc., fructiferi 8 unc. longi, graciles. *Bracteæ* sensim majores, ½—2-unciales. *Fructus* gracilis, apice rostratus, 2—2½ unc. longus, siccus ⅓ unc. latus, parietibus ut videtur coriaceis. *Semina* magna, ⅛ unc. diametro, insapida (*Hook. fil. ubi sup.*).

Owing to the fact of the flowers from which the name of *A. cereum* was derived belonging to the *A. Palustre* Afz., I have to suggest that this species should be designated in honor of the late Dr. Pereira, to whose indefatigable researches we stand so much indebted for our knowledge of those scitamineous products, usually understood as the *Grains of Paradise*.

This *Amomum* is very rare, and has hitherto been discovered only in the densely wooded and swampy ravines beyond the Sugar-loaf mountain in Sierra Leone. It has apparently not been noticed by the native populations, and therefore enjoys no vernacular appellation. The plant is of moderate growth, about 4—6 feet in height, bearing pale green, narrow lanceolate leaves, briefly petiolate, with an oblique base. The flowers are not known. The fruits are produced either singly, or conjunctively in two's or three's, supported by a long slender scape from 1½—2 feet high, and are furnished with short thin, papyraceous-like bracts, of a more delicate structure than others, and covered at intervals by minute dots. The pericarp in the ripe state is deep pink, thin, and compactly invests the mass of seeds. The pulp is slightly humid, sweetly or mildly acidulous, and divided

FIG. 11.



Amomum Pereirianum.
(Dried fruits and seeds).

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* The *Shea-toulon* of Park, obtained from the seeds of the *Bassia Parkii*, Don.

by septa into three equal parts, each part independently enclosing its own seeds, as in the preceding species. The capsule 2—3 inches long and 1¼ inches broad when dry, is oblong-ovate or cylindrical, of an orange or ruddy brown, smooth, barely striated, and dotted with reddish spots, especially near the apex, which is terminated by an infundibuliform remnant of the calyx (fig. 11). The seeds are large in proportion to the capsule, acutely and irregularly angular, of a yellowish or ruddy brown, with a glossy delicate striated testa, and small whitish circular concavity surrounded by a reddish areola, at the inferior extremity. They are destitute of any essential flavor, although the dried capsule when opened evolves an aromatic aroma.

In some respects the fruit and seeds appear to resemble the *A. citratum* of Pereira, which from their appellation of "*Grana Paradysi*" in the British Museum, doubtless came from some country in tropical Africa. The latter has, however, a larger and more tapering capsule, with the base contracted into an ovoid shape, and having that remarkable prolongation of apex, which permits of its artificial separation into two parts, thus serving to unite different fruits together in bunches. The seeds are larger, oblong, and of a paler hue, and possess that lemon-grass flavor by which they have been chiefly distinguished. It is not improbable that these two products may belong to mere varieties of the same plant, for the taste of the seeds, like their form and hue, we know is greatly modified by local agencies. It will however be necessary, from the want of this definite information, to consider them as distinct species. As a general rule, the seeds of the West African *Amoma*, when enveloped in an acid pulp, are more or less deficient in aromatic pungency and flavor, whereas (with the exception of the *A. longiscapum*) the contrary is the fact should the pulp be free from this peculiarity.

Although several other species of *Amoma* in leaf and flower only, have been brought from Sierra Leone, it would not be desirable, while the fruits remain unknown, to enter into any description of such fragmentary portions.

ON THE MANUFACTURE OF THE CHINESE GREEN DYE,

CALLED 綠膠 *LO-KAO.*

BY THE REV. M. HÉLOT,*

Missionary of the Company of Jesus.

On the 6th of August, 1856, I received through the Rev. Father Borgniet, Apostolic Pro-vicar of the Mission in Kiang-nan (China) a note addressed by the President of the Central Council for the Propagation of the Faith, of Lyons, on the subject of a certain Green Dye said to be used by the Chinese. A request accompanied it, that I would omit no steps in order to obtain a prompt and exact reply to the inquiries it contained.

Setting aside, therefore, all other engagements, I commenced my investigation. At Shanghai I could obtain no positive information; not only is the dye in question not prepared there, but it is not even found there in commerce; when Europeans inquire for it through their *compradors*, the latter obtain it from Soo-chow, and sell it at an exorbitant price.

I was, however, fortunate in discovering that the Green Dye was prepared on a considerable scale at Azé, a town of from 6000 to 8000 souls, situated eight leagues to the south of Kia-hin-fou, in the province of Tche-kiang. The Reverend Pro-vicar at once determined that I should proceed thither. A large Christian community of Tche-kiang located near Azé, facilitated my expedition, which would otherwise have been rather hazardous. M. Edan, French Consul at Shanghai, had the kindness to give me for a companion one of his most intelligent *employés*, one who had resided not far from Azé, and who had been formerly a pupil of the Reverend Fathers, the Lazarists of Tche-kiang. The worthy Christians received me with the utmost cordiality, and omitted nothing to put me in the way of obtaining the desired information. They would, in fact, at once have conducted me to the workshops where the manufacture was carried on, but at that season the process was not in operation. They therefore sent for the chief workmen engaged in the manufacture of the dye, and I interrogated them separately, and thus obtained an acquaintance, at least tolerably definite, as to the preparation of this valuable colour. This I hasten to lay before the President of the Central Council; if it considers it as still uncertain and insufficient, it will be desirable to pay another visit to Azé during the month of November;—or it would perhaps be still better to cause two or three workmen to come to Shanghai, and there and then to prepare the dye; some workmen of Azé, friends of the Christians there, have in fact offered to go.

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* [In the *Pharmaceutical Journal* for October last, there appeared some account of the Chinese Green Dye, from the pen of Mr. Daniel Hanbury. For the following more copious details, obtained by the Rev. M. Hélot, we are indebted to a friend in China. As the Dye in question appears likely to attract some attention, we have thought the notice of M. Hélot, although somewhat lengthy, of sufficient interest to merit translation. We have, however, slightly condensed it in some parts.—Ed. *Ph. Journ.*]

The following is the note which was received from the Central Council of Lyons:—

Note to be transmitted to the missionaries in China.

> "There occurs in trade at Shanghai, in China, a green substance resembling Javanese indigo, but not really indigo. This substance, which is called *Lo-kao*, is not prepared at Shanghai, but in some other part of China, which we know not. It is said that this green colouring matter is in China very scarce and dear. It is employed, nevertheless, in dyeing the coarsest cotton cloths, which appears a striking contradiction.
>
> "It would be very important for the manufacturers of Lyons to obtain some precise information on the following questions:
>
> "1. What is the price of the *Lo-kao* at Shanghai?
>
> "2. What is the plant, and what is the part of the plant that yields this green dye?
>
> "3. What are the processes employed by the Chinese for extracting the colour from the plant, and for employing it in dyeing?
>
> "4. Could one obtain with certainty the seeds of the plant whence the *Lo-kao* is extracted, as well as information regarding its culture and the situation most favourable for it?
>
> "We are aware that the points upon which we request information are numerous, and that they may be obtained with difficulty; but it being a question of obtaining a substance which would be of great service to our manufacturers, a small amount of information even would be useful.
>
> "The seed of a shrub, said to be that which furnishes the *Lo-kao*, has been received, and the shrub itself is cultivated; but as there is still some uncertainty as to its origin, it is very important to obtain it afresh, so that we may more confidently persevere in those labours which will lead to the desired result."

To commence my history:—About the years 1848 to 1850, specimens of some Chinese productions were sent to the Minister of Commerce; among them some cloth of a sea-green colour attracted attention. It was placed in the hands of some skilful chemists, who were astonished to find that they could not detect in it by reagents, either a blue or a yellow colour. Hence they inferred that its colour was due to some green colouring principle unknown in Europe. Traces of alumina and of iron were all that could be detected. As at this period we had no consul in China, the American Consul at Canton was addressed for more ample information. He could procure only about fifteen grains of the desired material, but the experiments made upon this small quantity gave the most satisfactory results. Recourse was again had to the American Consul, who succeeded this time in sending a pound of the dye at a price of 35 dollars, promising also to write to Shanghai for information about it, since it appeared not to be prepared in the south of China. M. de Montigny, who had just been appointed French Consul at Shanghai, now received from the Minister instructions to pay attention to the matter. Assisted by the Missionaries both of Kiang-nan and Tche-kiang, he succeeded in procuring some ounces of the Green Dye; but as it was necessary, in default of other information, to obtain it from Soo-chow-foo, its rarity and dearness were exaggerated by the dealers, and it had to be paid for at the rate of 10 dollars per oz.

About the year 1854, M. de Montigny sent seeds of the trees which furnish the *Lo-kao*, and two glass cases containing from two to three hundred plants, the whole obtained from authentic localities, through the intervention of the Lazarists of Tche-kiang.

Such was the position of the question, when the Reverend Apostolic Provicar commissioned me to investigate the subject, and the following is the information I have obtained:—

1. The trees which yield the *Lo-kao* belong to two species. At the period of the fall of the leaf, it is collected by the peasants in the districts where the dye is manufactured, and consists of fagots of small wood, known by the name of *Lo-za* (green-branch). The *Lo-za* is of two species, or it may be but two varieties of the same species: the one, which comes from the sterile mountains in the S.W. of Tche-kiang and Shantung, is called *Pa-bi Lo-za;* the other, which forms a bush, also uncultivated, occurs in the fertile plains in the neighbourhood of Azé in Tche-kiang, and is named *Hom-bi Lo-za.* At Azé, the fagot of 100 pounds of *Hom-bi Lo-za* costs 1000 *sapecs*, that is about 5 francs; while a similar fagot of *Pa-bi Lo-za* costs about three times that sum. I may remark that the name *Lo-za*, which is given to the shrub in Tche-kiang, is not its correct appellation, but only that of the branches made into fagots, and found as an article of trade for preparing the dye; for the word *za*, which signifies *fagot* or *small wood*, is employed to express any wood used for fuel. The people of Shantung, who also have this shrub on their mountains, say that it is called *Lieu-lo-chou* (*Lieu-green-tree*), and that at the commencement of winter it is carried about for sale in small fagots under the name *Lieu-lo-tche.*

I have had made by a Chinese artist a drawing from nature of a branch of the *Hom-bi Lo-za* loaded with seeds, still green, but which towards winter become black. The mail of December will, I hope, bring you about 50 lbs. of these seeds:—at least, I have taken measures that it shall do so. If you desire plants, a case of them can be sent, but I am assured that the seeds will answer quite as well. If I can do so, I shall send you seeds of the *Pa-bi Lo-za* also.

The seeds and shrubs which M. de Montigny sent are certainly authentic. Both the *Hom-bi* and the *Pa-bi Lo-za* ought to be found among them; they may be distinguished, if by no other method, at least by the colour and preparation, which is still to be described.

2. The preparation of the green dye with the bark of the *Hom-bi Lo-za,* as carried on at Azé, is as follows: —

The Lo-za is taken, as before mentioned, in the form of fagots of small wood, which are brought in by the peasants. Its bark is then roughly removed with a knife; it should not be quite dry, as the dry bark is no longer rich in colouring matter; this is why the branches are not stripped until the time for using the bark. The smaller branches are crushed with a hammer; in fact, in removing the bark, a good deal of the wood adheres to it, so that a fagot of 100 lbs. is reckoned to give half its weight of bark. Of this bark, 12 lbs. are taken to 150 lbs. of water, and a decoction is made: a froth appears on the surface, which froth is at first white, and then passes to rose colour. It is this peculiarity which has occasioned the name *Hom-bi* (red-bark) to be applied to this sort of *Lo-za*. When the froth or scum has assumed a rose colour, the fire is removed, and the contents of the boiler are poured into a large vessel and suffered to macerate for at least two days and two nights, after which it is ready for use. In very cold weather this maceration may be carried on for twenty days; if left longer the materials would spoil.

The preparation of the dye of the *Pa-bi Lo-za* is precisely the same, only that continued ebullition has not the effect of causing the froth to assume a rose colour, whence the name *Pa-bi* (white bark). Moreover, the maceration must be continued for at least ten days, whilst two days are sufficient in the case of the *Hom-bi*.

To insure success in the process of dyeing, clear, settled weather must be chosen, for the sun's action is absolutely necessary.

Placed ready for use, it is customary to have a vessel of lime water, which the Chinese prepare by putting the lime into a little bag and agitating it in a large quantity of water.

Dyeing Cotton Cloth green.—The dyeing-liquors both of the *Hom-bi* or *Pa-bi Lo-za*, being ready as well as the lime water, the colouring is communicated to the cloth by dipping it from seven to ten times in the decoction of *Hom-bi*, concluding by three dippings in that of the *Pa-bi*, care being taken to allow the cloth to dry between each immersion. The details of the operation are as follow:

We have already mentioned that the bark of the Lo-za is allowed to macerate two days in the case of the *Hom-bi Lo-za*, and ten in that of the *Pa-bi Lo-za*. The maceration being then complete, and the weather fine enough to admit of the dyeing process being commenced, the bark is removed from the liquor, and a small quantity of lime water added; the cloth is then plunged into the cold solution, wrung out so as to avoid any waste, and then, without rinsing, spread upon the ground to dry. It is important that the drying be not too rapid. For this reason, the dipping is not commenced till the latter part of the day, so that the cloth may be exposed all night and receive the benefit of the following day's sunshine. But even sunshine may be in excess. This operation having been repeated from seven to ten times with the liquor of the *Hom-bi Lo-za*, and afterwards with that of the *Pa-bi Lo-za* (lime water being added as in the former case), the cloth is dyed, but on one side only, viz., that which has been exposed to the sun. Such cloth is called here in commerce *Se-lo-pou* (coloured-green-cloth).

If after the dyeing operation is over, there still remains some of the solution unused, it may be employed the following day, a little more of lime water being added to it. If there is still some over for a third operation (which ought to be avoided), it may be used, provided a still larger quantity of the alkaline solution be added to it, and so on for any further residue.

I have asked many questions as to the use and properties of the two dyes *Hom-bi* and *Pa-bi*, and, so far as I can find, it seems clear that the solution of *Hom-bi Lo-za* gives a deeper, stronger shade, but without lustre or reflection; while the solution of *Pa-bi Lo-za*, though affording a feebler hue, imparts a magnificent lustre [*reflet magnifique*]. The ground of the colour is therefore produced with the *Hom-bi*, and it is completed with the *Pa-bi*; and thus is obtained the green colour that is most esteemed by the Chinese. I send you a small sample of cloth purchased at Shanghai for a sum equivalent to 25 French *centimes*. A similar quantity of uncoloured cloth is worth two-thirds the price. From data like these I estimate that the dyeing of a square *mètre* of cotton cloth costs from 8 to 9 *sous*.

I have put many questions, in order to discover if any of the mordants used by the Chinese for other dyes—such, for instance, as alum, green vitriol, potash, &c.—is ever employed with this green; but the constant reply has been, that no other than lime water is used. I have a suspicion, however, that in the north, the peasants do make use of a solution of alum.

(*To be continued.*)

CHEMICAL REPORT ON THE MODE OF DETECTING VEGETABLE SUBSTANCES MIXED WITH COFFEE FOR THE PURPOSE OF ADULTERATION.

BY PROFESSOR GRAHAM, DR. STENHOUSE, AND MR. DUGALD CAMPBELL.

Addressed to the Chairman of the Board of Inland Revenue.

(*Continued from page* 233.)

6. Coffee, and the various vegetable substances used in its adulteration, may be incinerated on a platinum or porcelain capsule, and leave an earthy ash, of which the composition is often characteristic of the plant. Valuable information may be obtained, without making a formal analysis of the ash, by simply digesting it in strong hydrochloric acid. The earth which remains undissolved after this treatment is silica. Now coffee, we find, is remarkably distinguished from the roots and cereals, by the small quantity of silica it affords. The quantity of that earth found in coffee is so small, that it may be doubted whether coffee contains any silica except what may accidentally adhere to the coffee-beans, when collected, in the form of sand. The proportion of silica found in the twelve samples of coffee of Table IV. was as follows:—

TABLE VII.

Silica in roasted coffee.

	Per cent. in ash.		Per cent. in ash.
Sample 1	0.	Sample 7	0.
" 2	0.	" 8	0.45
" 3	0.26	" 9	0.
" 4	0.02	" 10	0.
" 5	0.17	" 11	0.
" 6	0.28	" 12	0.09

The only case in which the silica approaches to half a per cent. of the ash is sample 8; and in another sample of the same coffee, which was properly screened before roasting, the silica of the ash fell to 0.

On the other hand, the silica and sand, insoluble in acids, of four samples of roasted chicory, amounted to so much as 10.69, 13.13, 30.71, and 35.85 per cent. of the ash. It may be added that the portion of this silica soluble in alkali, was, in the same samples, 2.61, 3.81, 10.52, and 12.75 parts; the portion of silica insoluble in alkali, 8.08, 9.32, 20.19, and 23.10 parts.

The whole silica in roasted dandelion root amounted to 11.26 per cent. of the ash.

In other cultivated roots the proportion of silica does not appear to be so large as in chicory. The silica is always expressed with reference to 100 parts of the ash. Messrs. Way and Ogston find in the root of the carrot from 0.76 to 1.92 silica; in beet, from 1.4 to 4.11 silica; and in turnip, from 0.96 to 2.75 silica.

The proportion of silica appears to be low in certain grains and seeds, although rarely descending to the insignificant proportion of the coffee-bean,—and to be very high in other grains. We find in the ashes of acorns 1.01 per cent. of silica; in maize, 1.78 per cent. of silica; in the white lupin of the Levant, 0.87 per cent. of silica. Messrs. Ogston and Way report from 2.05 to 5.46 silica for wheat; from 23.6 to 70.77 silica for barley; from 38.48 to 50.03 for oats; and 9.22 for rye.

It appears, therefore, that the presence of one per cent. or upwards of silica in the ashes of coffee is a proof of adulteration; that the adulterating substances, which increase the proportion of silica most considerably are oats and barley, then chicory and dandelion, which are followed by rye; wheat, beet, turnip, and carrots would produce a small and less decisive effect.

There will now be presented complete analyses, made for this inquiry, of the ashes of seven varieties of coffee, and four different samples of chicory.

TABLE VIII.

Analyses of the Ashes of Coffee and Chicory.

COFFEE.

	Plantation Ceylon.	Native Ceylon.	Java.	Costa Rica.	Jamaica.	Mocha.	Neilgherry.
Potash	55.10	52.72	54.00	53.20	53.72	51.52	55.80
Soda	—	—	—	—	—	—	—
Lime	4.10	4.58	4.11	4.61	6.16	5.87	5.68
Magnesia	8.42	8.46	8.20	8.66	8.37	8.87	8.49
Sesquioxide of iron	0.45	0.98	0.73	0.63	0.44	0.44	0.61
Sulphuric acid	3.62	4.48	3.49	3.82	3.10	5.26	3.09
Chlorine	1.11	0.45	0.26	1.00	0.72	0.59	0.60
Carbonic acid	17.47	16.93	18.13	16.34	16.54	16.98	14.92
Phosphoric acid	10.36	11.60	11.05	10.80	11.18	10.15	10.85
Silica	—	—	—	—	—	—	—
Sand	—	—	—	—	—	—	—
Total amount	100.63	100.20	99.77	99.06	100.18	99.68	100.04

CHICORY.

(Deducting sand and silica.)

	Darkest English (Yorkshire).	English.	Foreign.	Guernsey.
Potash	38.53	27.85	46.07	46.27
Soda	9.34	16.90	3.17	5.49
Lime	10.79	10.81	7.78	7.65
Magnesia	6.06	8.08	5.33	5.55
Sesquioxide of iron	4.38	3.50	8.29	5.08
Sulphuric acid	11.38	11.78	8.38	8.67
Chlorine	5.67	5.23	5.03	6.58
Carbonic acid	2.04	3.22	4.36	4.60
Phosphoric acid	12.27	12.61	11.00	9.59
Silica	—	—	—	—
Sand	—	—	—	—
Total amount	100.46	99.98	99.41	99.48

(Deducting sand and not silica.)

	Darkest English (Yorkshire).	English.	Foreign.	Guernsey.
Potash	37.07	27.18	40.20	41.41
Soda	8.99	16.46	2.77	4.92
Lime	10.38	10.53	6.79	7.85
Magnesia	5.83	7.87	4.66	4.97
Sesquioxide of iron	4.22	3.41	7.24	4.55
Sulphuric acid	10.95	11.48	7.32	7.76
Chlorine	5.46	5.10	4.39	5.89
Carbonic acid	1.97	3.14	3.81	4.12
Phosphoric acid	11.81	12.29	9.60	8.59
Silica	3.81	2.61	12.75	10.52
Sand	—	—	—	—
Total amount	100.49	100.02	99.53	99.58

(Not deducting sand and silica.)

	Darkest English (Yorkshire).	English.	Foreign.	Guernsey.
Potash	33.48	24.88	29.56	32.07
Soda	8.12	15.10	2.04	3.81
Lime	9.38	9.60	5.00	5.31
Magnesia	5.27	7.22	3.42	3.85
Sesquioxide of iron	3.81	3.13	5.32	3.52
Sulphuric acid	10.29	10.53	5.38	6.01
Chlorine	4.93	4.68	3.23	4.56
Carbonic acid	1.78	2.88	2.80	3.19
Phosphoric acid	10.66	11.27	7.06	6.65
Silica	3.81	2.61	12.75	10.52
Sand	9.32	8.08	23.10	20.19
Total amount	100.85	99.98	100.66	99.68

The first difference which appears upon comparing the two sets of analyses, is the absence of soda in coffee, and its presence in chicory to the extent of from 2.04 to 15.1 per cent. of the ash. The united amount of potash and soda does not differ much in the two substances. In chicory, the lime is greater and the magnesia less than in coffee. The sesquioxide of iron is strikingly different, being always under one per cent. in coffee, by our experiments, and ranging from 3.13 to 5.32 per cent. in chicory. The ash of chicory is, on this account, red to the eye when compared with that of coffee. The difference in chlorine is also important, the highest proportion observed in coffee-ash being 1.11 per cent., and the lowest proportion in chicory-ash 3.28 per cent. Coffee gives an ash which is highly carbonated, the cabronic acid varying from 14.92 to 18.13 per cent.; while the ash of chicory is only slightly carbonated, containing from 1.78 to 3.19 per cent. of carbonic acid. The proportion of phosphoric acid is pretty similar in the two kinds of ash. The disparity in the silica has been already referred to.

The differences most available in the two kinds of ash, as distinctive tests for coffee and chicory, appear to be the following:—

	In Coffee-ash.	In Chicory-ash.
Silica and sand	—	10.69 to 35.85
Carbonic acid	14.92 to 18.13	1.78 to 3.19
Sesquioxide of iron	0.44 to 0.98	3.13 to 5.32
Chlorine	0.26 to 1.11	3.28 to 4.93

Another series of ash analyses was executed, comprising the ash of the white lupin of the Levant—a seed which, from its chemical properties and low price, is not unlikely to be substituted for coffee—the ash of acorns, of maize, and of parsnip and dandelion roots.

TABLE IX.

Analysis of ashes of certain seeds and roots.

(Not deducting silica, &c.)

	Lupins.	Acorns.	Maize.	Parsnips.	Dandelion root.
Potash	33.83	55.49	31.28	56.86	20.22
Soda	17.90	0.63	—	—	34.87
Lime	7.81	6.98	3.11	6.88	12.87
Magnesia	6.23	4.36	14.98	6.52	1.47
Sesquioxide of iron	—	0.54	0.85	0.53	1.42
Chlorine	2.12	2.53	0.50	2.10	4.32
Sulphuric acid	6.85	4.83	4.20	4.09	2.66
Carbonic acid	0.56	13.82	—	11.50	6.99
Phosphoric acid	25.74	11.26	45.29	13.91	12.63
Silica, &c.	—	—	—	—	—
Total amount	101.04	100.44	100.21	102.39	97.45

Analyses of Ashes of certain Seeds and Roots.

(Not deducting silica, &c.)

	Lupins.	Acorns.	Maize.	Parsnips.	Dandelion Root.
Potash	33.54	54.93	30.74	56.54	17.95
Soda	17.75	0.63	—	—	30.95
Lime	7.75	6.01	3.06	6.85	11.43
Magnesia	6.18	4.32	14.72	6.49	1.31
Sesquioxide of iron	—	0.54	0.84	0.53	1.27
Chlorine	2.11	2.51	0.50	2.09	3.84
Sulphuric acid	6.80	4.79	4.13	4.07	2.37
Carbonic acid	0.56	13.69	—	11.44	6.21
Phosphoric acid	25.53	11.15	44.50	13.84	11.21
Silica, &c.	0.87	1.01	1.78	0.57	11.26
Total amount	101.09	99.58	100.27	102.42	97.80

In the ash only of the dandelion root is the silica sufficiently large in quantity to make a good distinction from coffee. Lupins and maize are distinguished from coffee by their low proportion of carbonic acid. The white lupin, both of the Levant and England, we find to contain a notable quantity of manganese. The oxide of iron is everywhere too low to be serviceable. Chlorine appears as low in maize as in coffee, but the proportion of that element is doubled in lupins, acorns, parsnips, and nearly quadrupled in dandelion: a high proportion of phosphoric acid distinguishes maize, and we may add all the other cereals, from coffee.

The ash of the turnip root contains, according to Way and Ogston, from 9.54 to to 14.82 per cent. of carbonic acid, which is very different from chicory, and nearly as high as in coffee. The sesquioxide of iron of turnip is also given even lower than in coffee—from 0.14 to 0.66 per cent. Chlorine appears to be as abundant in the turnip, in the form of chloride of sodium, as in the chicory root.

According to the same excellent authorities, in beetroot-ash the carbonic acid varies from 15.23 to 21.61 per cent., and is therefore quite as high as in coffee-ash;

the sesquioxide of iron, from 0.52 to 3.74 per cent., small as in coffee; the chlorine very large and distinctive, being represented by from 14.18 to 49.51 per cent. of chloride of sodium.

In the ash of the carrot, the carbonic acid is from 15.15 to 19.11 per cent.; the sesquioxide of iron, from 0.59 to 1.66 per cent.; chlorine nearly as in chicory, being represented by from 4.91 to 7.65 per cent. of chloride of sodium (Way and Ogston).

7. The action of the more ordinary chemical reagents upon infusions of coffee and chicory may now be noted. The indications thus obtained with coffee are unfortunately rendered much less characteristic by the torrefaction of the seed.

TABLE X.

Action of certain Chemical Reagents upon Infusions of Coffee and Chicory.

	Raw Coffee.	Roasted Coffee.	Raw Chicory.	Roasted Chicory.
Potassa	A bright reddish-yellow liquid, and no precipitate.	Brownish-yellow liquid, and no precipitate.	Not altered.	Not altered.
Lime-water	Pale-yellow liquid; on standing, becoming green at the surface; no precipitate	Reddish-brown, with shade of purple, and no precipitate.	Not altered.	Not altered.
Acetate of copper ...	Dirty-green precipitate.	Brownish-green-precipitate.	Pale-green precipitate.	Gelatinous precipitate of a reddish-brown colour.
Perchloride of iron...	Deep-greenish-black precipitate.	Very dark greenish-black precipitate.	Blackish-brown coloured liquid.	No effect.
Nitric acid...............	Bright red-coloured liquid.	Clear port-wine-coloured liquid.	No effect.	No effect at first; on standing, port-wine colour.
Sulphuric acid.........	Dirty blackish-brown-coloured liquid	Dark blackish-brown-coloured liquid.	Deep blackish-brown-coloured liquid.	Brownish-black liquid.
Hydrochloric acid ...	Pale brownish-yellow liquid.	Port-wine-coloured liquid.	No effect.	Slightly darkens the liquid.

In allowing a solution of unroasted coffee to stand, its green colour becomes gradually deeper. This change is due to oxidation and the formation of the viridic acid of Rochleder. It is greatly promoted by the presence of an alkali: an excess of lime brings out this colour very strongly in a day or two,—giving at first, however, a bright yellow colour. Subacetate of lead gives, in unroasted coffee, a yellow precipitate, which does not become green. An excess of acetate of copper gives a green precipitate in abundance, which is brightened by the addition of an alkali. This copper precipitate has been used as a green pigment. The reactions above described are, however, much altered and obscured by the roasting of the coffee, and are therefore of little service for our present purpose.

It has already been stated that iodine produces no blue colouration in the infusion of either coffee or chicory. If the reagents named act clearly in a different manner upon any infusion from what they do upon pure coffee, a presumption of adulteration is obtained, but the indications must be of a positive and specific nature fully to establish adulteration.

8. Coffee was submitted to the usual process of distillation with soda-lime for the determination of its nitrogen. The proportion of nitrogen per cent. was, in coffee, sample 1 (Table VII.), roasted, 2.93; in sample 2, roasted, 2.62; in sample 3, raw,

2.53, roasted, 2.70; in sample 4, raw, 2.71; in sample 5, raw, 2.50, roasted, 2.48. The proportion of nitrogen in roasted coffee appears therefore to lie between two-and-a-half and three per cent.

The nitrogen in a specimen of foreign chicory amounted, in the raw chicory, to 1.51 per cent.; in the same roasted, 1.42 per cent. The same of English growth gave, in the raw state, 1.86 per cent. of nitrogen; and in the roasted state, 1.74 per cent.

The proportion of nitrogen in coffee is therefore greater than in chicory; but the difference is not sufficiently marked to distinguish the two substances easily from each other. The conclusion may, however, be drawn, that less than two per cent. of nitrogen in coffee is a strong presumption of adulteration.

We may now advert to the peculiar and characteristic substances found in coffee, and the aid to be derived from them in the discovery of adulteration.

9. Professor Rochleder, who has devoted great attention to the analysis of coffee, gives the following enumeration of the substances found in the raw coffee-bean, with the formulæ of their elementary composition:—

		C.	H.	O.	N.
Woody fibre		12	10	10	
Cane-sugar		12	11	11	
Fat	Palmitic acid	32	32	4	
	Oleic acid	36	34	4	
	Glycerine	6	8	6	
Legumin		48	36	14	6
Caffeic acid		16	7	6	
Caffeine		16	10	4	4

To these Rochleder had lately added citric acid ($C_{12}H_5O_{11}+3HO$), in the small proportion of two grains in a pound of coffee; also a trace, too small to be estimated by weight, of viridic acid ($C_{14}H_8O_7$). This last substance is the acid obtained by exposing solutions of the neutral and basic caffeates to the influence of the air. The green colour of raw coffee is believed by Rochleder to be owing to a small quantity of viridate of lime.

The evidence upon which Rochleder rests the existence of palmitic and citric acids in coffee does not appear to us quite decisive. The formulæ given by that chemist for both caffeic and viridic acids are doubtful.

It is also stated by Rochleder, that when dried caffeic acid is submitted to destructive distillation, a small quantity of crystals were obtained, which he considered to be pyrocatechine. The experiment repeated by us on a considerable scale gave a negative result.

Rochleder finds caffeic acid in Paraguay tea (*Ilex Paraguayensis*), as well as in coffee. This statement we must also doubt. The acid of the Paraguay tea has been examined by us, and found to have a certain resemblance to caffeic acid, but not to be identical with it. Free caffeic acid, when strongly heated in an open vessel, emits the peculiar odour of roasted coffee; but the acid from Paraguay tea emits a perfectly different odour when similarly treated.

The sugar of coffee may be inferred to exist in a peculiar condition, as was before hinted, from the fact that when the coffee is roasted, none of its sugar appears to be converted into grape-sugar, as it does not affect Trommer's test; while, when seven grains of cane-sugar were added to 100 grains of coffee, and the whole roasted in the usual way, abundant indications of grape-sugar were obtained by the same test.

M. Payen gives the proportional quantities of the different substances which he finds in raw coffee as follows:—

Cellular tissue	34.000	Nitrogenous portion	3.000
Hygroscopic water	12.000	Free caffeine	0.800
Fats	10. to 13.000	Thick insoluble ethereal oil	0.001
Starch, sugar, dextrin, and vegetable acids	15.500	Aromatic oil	0.002
Legumin	1.000	Mineral constituents: potash, lime, magnesia, phosphorus, sulphur, silica, and traces of chlorine	6.697
Chlorogenate of potash and caffeine	3.500		

Payen's chlorogenic acid is the same as the caffeic acid of Rochleder and Pfaff

Payen believed that he had obtained from coffee a crystalline double salt of this acid, containing potash and caffeine; but this observation has not been confirmed.

The proportion of fat in the coffee-bean is remarkably high, being generally stated at ten or above ten per cent. We found at least 8.9 per cent. of fat readily extracted by ether. In chicory the proportion of natural fat is scarcely appreciable; but it is brought up by the fat added in the process of roasting the chicory.

10. Some uncertainty existing respecting the proportion of the active principle, caffeine, in coffee, the point was particularly inquired into. The following process was adopted:—The raw coffee was ground fine, having been previously well dried at 212° to facilitate that operation. A decoction was then made of 1000 grains, by the repeated application of boiling water, so as to exhaust the coffee of all soluble matter. The solution was concentrated a little by evaporation. The acid of the coffee, and certain other substances, were now entirely precipitated by the addition, first, of the neutral acetate of lead, and then of the subacetate of lead. These insoluble matters were removed from the liquid by filtration. The excess of lead in solution was then thrown down by means of hydrosulphuric acid.

The liquid, after this preparation, was evaporated to dryness, and the dry matter left was exhausted by means of strong spirit of wine (sp. gr. 0.840). The alcoholic solution was concentrated by evaporation, and allowed to stand in a nearly syrupy state for about ten days, in order to crystallize. The crystals, which are caffeine, were collected upon a small filter, and compressed powerfully to remove the mother-liquor. These crystals were re-dissolved in a small quantity of water, the solution evaporated, and crystallized anew. It gave almost nothing but caffeine, in long silky white needles, with little or no colour. The proportion of caffeine obtained in five experiments, made upon different samples of coffee, was as follows:—

Caffeine in raw coffee.

In Native Ceylon	0.80 per cent.
" " "	0.80 " "
" " "	1.01 " "
" Plantation Ceylon..........	0.54 " "
" " "	0.83 " "

The caffeine of the wild coffee appears to exceed that of the cultivated plant; the mean proportion of caffeine in Native Ceylon being 0.87 per cent., and in Plantation Ceylon 0.69 per cent.

The mean average of the whole five samples is 0.80 per cent. of caffeine. Probably the actual quantity of caffeine in the coffee-bean is from 0.75 to one per cent., allowance being made for losses in the separation.

The proportion of theine (or caffeine) in tea is considerably greater, and more easily extracted. Two pounds of fine strong Congou yielded 2.93 grains of theine, or 2.09 per cent.

When it is merely desired to extract caffeine from raw or roasted coffee, without reference to quantity, the general process for the extraction of organic bases by means of ether suffices. Lime is added to the infusion of coffee, which is then evaporated to dryness upon a water-bath. The extract may be divided by means of clean sand, and then agitated with ether. The caffeine crystallizes as the ether evaporates, or it may be re-dissolved in water, and crystallized again. We believe that the caffeine from ten per cent. of coffee in a mixture might be extracted in sufficient quantity for its identification by the preceding simple process. Caffeine, when once obtained, is fully recognized by its easy sublimation, and also by its action with nitric acid, in which it resembles uric acid. When the solution of caffeine in nitric acid is evaporated to dryness, and exposed to ammoniacal gas, it is covered by a pink blush, like murexide.

The only other substances besides coffee in which caffeine is known to exist, are tea, Paraguay tea, and a species of chocolate made from the *Gaurana officinalis* or *Paullinia sorbilis.*

11. Chemists generally are disposed to refer the flavour and peculiar properties of coffee, as a beverage, more to its acid—the *caffeic acid* (particularly after that substance is modified in its properties by roasting), than to any other constituent of the seed. Rochleder considers this acid as belonging to the tannin class of substances,

and calls it tanno-caffeic acid. But as caffeic acid does not precipitate gelatine, it is deficient in the most characteristic quality of the tannic acids. Caffeic acid, in the present state of our knowledge, appears to be confined to the coffee-plant.

We have observed a property of caffeic acid which facilitates the detection of that substance, and consequently of coffee, in a mixture. Caffeic acid appears to be analogous to kinic acid, the acid of cinchona barks, for it yields kinone when oxidated by means of sulphuric acid and binoxide of manganese. To observe this property, the coffee is boiled with water and a little slaked lime, the infusion filtered, and evaporated down to the consistence of a syrup. The syrupy liquid is then mixed in a retort with four times its weight of binoxide of manganese, and one part of oil of vitriol diluted with an equal bulk of water. Sufficient heat is produced by the action of sulphuric acid upon the other materials, to bring over the greater portion of the kinone, and the lamp need not be applied till towards the close of the operation. The distillate consists of yellow crystals of kinone, which usually coat the neck and sides of the retort, and a bright yellow liquid, which is a saturated aqueous solution of kinone, with a considerable quantity of formic acid. Kinone is easily discernible by its volatility and peculiarly acrid odour, which greatly resembles that of chlorine. The solution of kinone gives with ammonia a sepia-black colour, and becomes reddish-brown with hydrosulphuric acid. It is decolourized by sulphurous acid. The beautiful green hydrokinone is obtained by exactly neutralizing the solution of the yellow kinone with sulphurous acid, great care being taken not to introduce the latter in excess.

The peculiar acid of Paraguay tea agrees with caffeic acid (to which it is no doubt related) in yielding kinone to similar oxidizing agencies: so does the acid of the leaves of common holly (*Ilex aquifolium*) tea, and the whole of the *cinchona* tribe.

The *prune* tribe of plants, including the sloe, cherry, laurel, &c., the seeds of which yield prussic acid, all contain amygdalin, or some similar principle. Now all of these, when oxidized in the same manner as the former class, yield oil of bitter almonds, and so can be recognized.

The *willow* and *poplar* tribe, on the other hand, yield oil of *Spirea ulmaria* (salicylous acid), a very characteristic substance.

The tests for kinone can be applied in a few minutes, and they are sufficient to indicate the presence of ten or twelve per cent. of coffee in a mixture.

12. The root of *chicory* presents no feature of a marked nature, beyond its large proportion of sugar and the composition of its ash, which have both been sufficiently adverted to. The proportion of fat naturally in the root is quite insignificant. In an infusion of the fresh undried root, neutral acetate of lead appears to throw down the whole acids of chicory, and the subacetate of lead produces no further precipitate in the liquid. But the root appears to undergo a considerable modification by being dried at a temperature not exceeding 212°. Its infusion now gives a second precipitate with subacetate of lead following the neutral acetate. Both of these precipitates can be well enough washed; but when the attempt was made to decompose either of them by means of hydrosulphuric acid, a mucilaginous liquid was obtained, from which the sulphide of lead does not fall, unless with a considerable addition of alcohol. The acid precipitates appear most indeterminate, and afford nothing crystalline. A great deal of pectin-looking substance is present. Chicory also appears to possess about one-fourth of the quantity of inulin that is contained in the dried root, and starch in no other form, the infusion of chicory giving only a brown with iodine, and no blue. Chicory appears to contain no oxalic, malic, citric, or any other crystallizable organic acid. The other sweet roots, beet, turnip, &c., also, like chicory, present little that is tangible in their chemical properties. But the dark colour of the infusions of all these roots when roasted, the great density of their solutions, and their fermentability, afford sufficient means for distinguishing them from coffee, and for discovering their admixture with that substance.

The properties of a great variety of other vegetable substances, which might possibly be employed in the adulteration of coffee, are exhibited in the early tables of this Report.

PRE-EXISTENCE OF COLCHICINE IN THE SEEDS OF COLCHICUM.

BY L. OBERLIN.

As this substance might be the result of the action of reagents upon the normal materials of the seeds of the *colchicum*, I endeavoured to ascertain its pre-existence, and I believe I have succeeded by proceeding in the following manner:—

I dissolved the alcoholic extract of the seeds of *colchicum*, previously freed from oil and starchy matter, in alcohol, and decolourized it by well-washed charcoal; after filtration, the charcoal was treated repeatedly with boiling alcohol, which was added to the first liquid. The syrup extract which remained after distillation, when dissolved in water and slightly acidulated with very dilute sulphuric acid, gives rise to a flocculent precipitate; the liquid, when filtered and left for some weeks, produces warty crystals. These crystallize in alcohol, and are identical with colchicine.

The action of acids upon analogous bodies having given rise to decompositions producing peculiar principles and glycose, I endeavoured to ascertain the presence of the latter in the mother-liquors from which the crystals of colchicine were deposited, but I only succeeded in isolating a resinous matter, insoluble in water, combined with some colouring matter, and very soluble in alkalies, a product consequently of an acid nature. The characters of this resinous matter are, that it is soluble in alcohol and ether, acquires a blood-red colour with nitric acid, and dissolves in ammonia, to which it also gives an intense red colour.

Physiological Experiments.—According to experiments made by Prof. Schroff[*] of Vienna, the colchicine obtained according to the process of Hess and Geiger, has a poisonous action upon rabbits even in doses of 0.01 grm.; the animal dies in from twelve to eighteen hours. Given in large doses, even of 1 grm., it does not produce death in less than seven or eight hours. When colchicine is injected into the stomach in a dose of 0.01 grm., the animal does not die for ten or twelve hours, but in a dose of five centigrms. it causes a complete paralysis of the members, and death in a few minutes.—*Comptes Rendus.*

ON THE DECOMPOSITION OF NITRATE OF POTASH BY CHARCOAL.

BY A. VOGEL, JUN.

The author has studied the behaviour of charcoal to nitrate of potash at various high temperatures. He obtained the following results:—

1. The oxidation of carbon by means of nitrate of potash takes place completely, and without incandescence, at a temperature which scarcely exceeds the melting point of nitrate of potash.

2. The carbon is oxidized in this process to carbonic acid, and never to carbonic oxide gas.

3. The nitric acid is decomposed into nitrogen, nitric oxide, and nitrous acid, according to circumstances.

4. According to the temperature and the relative quantities of carbon and nitrate of potash, the potash in the residue left after the process of decomposition exists as nitrite and carbonate of potash, accompanied by undecomposed nitrate of potash.

5. These processes are represented by the following equations:—

a. Residue, nitrite of potash.

$$\text{1 equiv. KO, NO}_5+\text{1 equiv. C.}$$

$$\left.\begin{matrix}\text{KO, NO}_5\\ \text{C}\end{matrix}\right\} = \text{KO, NO}_3+\text{CO}_2$$

b. a. Residue, carbonate of potash; gas consisting of carbonic acid and nitrogen.

$$\text{2 equivs. KO, NO}_5+\text{5 equivs. C.}$$

$$\left.\begin{matrix}2\ (\text{KO, NO}_5)\\ 5\ \text{C.}\end{matrix}\right\} = 2\ (\text{KO, CO}_2)+3\ \text{CO}_2+2\ \text{N.}$$

β Gas consisting of carbonic acid and nitric oxide.

$$\text{2 equivs. KO, NO}_5+\text{3 equivs. C.}$$

$$\left.\begin{matrix}2\ (\text{KO, NO}_5)\\ 3\ \text{C.}\end{matrix}\right\} = 2\ (\text{KO, CO}_2)+\text{CO}_2+2\ \text{NO}_2$$

The latter process takes place only in a less degree together with the others.

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[*] *Oesterreich. Zeitschr. für prakt. Heilkunde*, June 6, 1856.

6. Carbonic oxide gas does not exert a decomposing action upon melted nitrate of potash; but in the nascent state, in a mixture of oxalate of potash and nitrate of potash, becomes oxidized to carbonic acid at a temperature at which oxalate of potash itself is quite stable.

7. For the preparation of chemically-pure nitrite of potash, the process of reducing nitrate of potash by charcoal is to be preferred to the method hitherto employed of calcining nitrate of potash by itself.

8. In the detection of small quantities of carbon by the formation of carbonate of potash, by means of fusion with nitrate of potash, an excess of the latter is to be avoided, as with an excess of nitre no carbonate of potash is formed, but only nitrite of potash.—*Abhandl. der Konigl. bayer. Akad. der Wiss.*

ON THE PRODUCTION OF MANNITE BY MARINE PLANTS.

BY T. L. PHIPSON.

When some marine Algæ are dried in the open air, they produce an efflorescence of mannite on their surface. Such are the *Laminaria saccharina*, *L. digitata*, *Rhodymenia palmata*, *Fucus siliquosus*, *F. nodosus*, *F. vesiculosus*, *F. saccharinus*, *F. serratus*, &c. The author has observed this production of mannite on many of these Algæ, and feels no doubt that all the Algæ which contain vegetable mucilage may give origin to this substance when placed in circumstances favourable to its production.

It has been supposed that the production of mannite by these plants was due to a *secretion* by the living plant; the author has ascertained that it is only produced after the cessation of the vital activity of the plant. He also thinks that the production of mannite is always the result of a peculiar fermentation, the effect of which is to deoxidize the vegetable mucilage, and convert it into mannite.

Many marine Algæ contain such large quantities of mucilage, that some naturalists have endeavoured to make use of this product in the arts. (Thus Brown (*Edin. Phil. Journ.*, xxvi., p. 409) found that by prolonged ebullition with dilute sulphuric acid this mucilage was converted into *arabine*.)

The author obtained considerable quantities of mannite by placing the sea-weeds, whilst moist, between sheets of brown paper, so that the access of air was not prevented, and leaving them thus for about eight days. Their surface was then covered by an efflorescence of mannite. In this case it is produced rather in a granular than a crystalline form; but when dissolved in water, it crystallizes, on the evaporation of the liquid, in tufts of long colourless needles.

The production of the mannite may take place as follows. Supposing the formula of the mucilage to be $C_{12}H_{10}O_{10}$, which represents the composition of the substance dried *in vacuo* at 266° F., by losing 1 equiv. of oxygen in the presence of water, it may split into 2 equivs. of mannite; thus—

$$\underset{\text{Vegetable mucilage}}{C_{12}H_{10}O_{10}} + \underset{\text{water}}{4\,HO} = \underset{\text{mannite}}{2\,C_6H_7O_6} + \underset{\text{oxygen.}}{O}$$

Mannite is also produced during the viscous fermentation, in which a viscous matter of the nature of gum is formed (in wines, beers, and vegetable juices in course of alteration), and in this case the mannite is evidently produced by a deoxidizing action exerted by the fermenting matter upon the viscous substance.

The intercellular mucilage of a sea-weed being decomposed during the production of mannite, the superficial tissue of the plant is deteriorated; this is the case especially in the *Laminaria saccharina*, one of the Algæ which furnishes most mannite. With the microscope the latter is seen accompanied by a great number of isolated spherical cells, arising from the destruction of the tissues of the plant; the application of water dissolves the mannite and sets free the cells. In the frond, when there is no mannite on its surface, these cells are seen in juxtaposition and implanted in a mucilage, forming a smooth continuous layer, which becomes pulverulent by the formation of the mannite.

The body which causes the alteration of the mucilage in the Algæ is probably the albuminous matter which is contained in all vegetables, and becomes altered in the air, giving rise by its continued alteration to those disagreeable odours, which characterize the putrefaction of the Algæ.

The author therefore thinks that mannite is produced rather from vegetable mucilage than from sugar, and that wherever vegetable mucilage is subjected to a deoxidizing action mannite will be formed.—*Comptes Rendus.*

WRITING INK IN CAKES.

A. Leonhardi gives the following formula for ink which will admit of being sent to a great distance and at any time of the year with convenience of transport, and possessing at the same time all the requirements of an excellent article. The "ink-powders" hitherto found in commerce are not to be compared with it, for they not only possess a different composition, but never dissolve completely to form a clear solution in water, and their employment is attended with so many inconveniences and disadvantages, that they have been given up. Common black ink may indeed be evaporated to dryness, but it leaves a residue which does not again dissolve completely in water, and never furnishes a useful ink by this solution. The recipe for the preparation of the cake-ink is as follows:—

42 parts of Aleppo galls and 3 parts of Dutch madder are extracted with a sufficient quantity of hot water; the fluid is then filtered, 5½ parts of sulphate of iron are dissolved in it, and 2 parts of a solution of iron in wood vinegar, with 1½ part of solution of indigo are added to it. The mixture is evaporated to dryness at a moderate heat, and formed into cakes of a proper size (for instance, 5 inches long, 3½ inches broad, and ⅜ inch thick.)

1 part of this cake-ink dissolved in 6 parts of hot water, furnishes an excellent writing and copying ink; whilst even with 1 part of cake-ink and 10 to 15 parts of water, beautiful writing inks are obtained.—*Mittheil. des Gewerbevereins für das Königr. Hannover*, 1856, p. 246.

ON A METHOD OF IMPARTING A RED COLOUR TO BONE AND IVORY.

BY DR. J. C. KELLERMANN.

The bone to be coloured is laid for fifteen to twenty minutes in very dilute cold nitric acid of the strength of a good vinegar; this dilute nitric acid is obtained by mixing fully half a litre of soft water with about thirteen grms. of nitric acid. The bone is then immersed for fifteen to twenty minutes in a solution of protochloride of tin, made by dissolving a piece of the size of a lentil in a pint of water. The objects thus mordanted are then put into the following red-bath, which must first be heated until it begins to boil.

Red-bath.—For an experiment on the small scale, take three to five grs. of fine red carmine, pour to it ten or twelve drops of ammonia, and stir it up well until the carmine is dissolved, then add about two ounces of soft water. In this bath, when heated to boiling, the objects must be left for about fifteen minutes. The tints obtained are more vivid when the boiling of the bath is not continued whilst the objects are in it.

If it be desired to change the tint thus obtained (a very fiery carmine-red) to a more scarlet colour, one of the following methods may be employed. When the red-bath begins to boil, and immediately after the objects have been immersed in it, five to ten drops of tartaric acid of the strength of a good vinegar may be added; or the water in which the protochloride of tin is to be dissolved may be mixed with an extremely small quantity of English sulphuric acid.—*Dingler's Polytechn. Journal*, cxli., p. 67.

DECOMPOSITION OF SOLUTION OF ACETATE OF MORPHIA.

Sir,—An insertion of the following in next month's *Pharmaceutical Journal* may be of some benefit both to patient and prescriber. Having had occasion, during the last week, to make up a sedative draught for my brother according to the following prescription by a London surgeon—

℞ Liq. Morph. Acetatis, ♏ xx.
Spt. Æther. Nit., ʒss.
Aquæ ad ℥iss.
Ft. haustus h. s. s. si opus sit.;

I remarked that when the draught was first made up it was colourless and effective, but when it had been made a day or two it had acquired a straw colour (doubtless from the yellowing of the morphia by the free nitric acid in the spirit of nitre), and was useless. I found, on examining my spirit of nitre, that it was, as I had anticipated, very acid.

I would also notice the well-known fact that Liq. Morph. Acet. becomes brownish on keeping, as I remarked that a draught which was made in London from the same prescription, and which had a brownish but no yellow tint, was equally ineffective with mine, which had become yellow.

Now, seeing that the brownish draught did not assume a yellow tint on being kept, I presume the acetate of morphia must have been decomposed, or the nitric acid would have detected it, giving its characteristic colour.

As this browning of the solution is a common case, small quantities only should be prepared where little dispensing is done, and it should on no occasion be used even then if it have acquired the brown colour.

I am, sir, yours respectfully,
Edward Wood.

31, *Richmond Place, Brighton, Feb.* 27, 1857.

Northern Circuit, Liverpool.

THE PECUNIARY VALUE OF HUMAN LIFE.

Just at the time of going to press we observe the report of a case, Bramwell *v.* Lees. The action was brought by plaintiff for compensation for the loss of his daughter, nearly thirteen years of age, in consequence of taking laudanum supplied to her by defendant, a Chemist, by mistake, instead of tincture of rhubarb. The tincture was sold to the wife of the plaintiff, who brought a cup, and asked for two-pennyworth of tincture of rhubarb. She returned home, mixed the tincture with some sugar and warm water, and gave it to her daughter, who, in a few minutes, complained of numbness in the legs, sickness, and other symptoms. A medical man was sent for, but the patient died the next day, and it was proved that laudanum had been taken instead of tincture of rhubarb. Defendant had paid the doctor's bill and given £5, which plaintiff considered not enough. He estimated the value of his daughter's services at five shillings a week, which he expected to obtain on her attaining the age of thirteen. The jury found a verdict for the plaintiff; damages £15,—one shilling of it to the grandfather.

POISONING BY ARSENIC IN CHINA.

(CORRESPONDENT OF THE "TIMES.")

As we were writing our last advices, on the 15th inst., there was a report that an attempt had been made to poison a large portion of the community, arsenic having been mixed with the bread at one of the principal bakeries of the place. This proved to be the case, and several hundred people suffered from eating the bread; but we are happy to add we have heard of no fatal consequences, though many are still suffering from the effects. We believe it is agreed among the medical men that the consequences were not fatal, owing to the large quantity of arsenic used, which acted generally as a violent emetic. The head man of the bakery, known as Allum, left per steamer for Macao early in the morning of the day the occurrence took place. There was some delay on the part of Government in sending after him, but a foreign gentleman, a sufferer from the atrocious attempt, chartered a steamer, and succeeded in capturing Allum before he got on shore at Macao. He was brought back here, and his trial, with that of several of the men who were employed on the premises, comes on at the sessions now sitting.

Hongkong, Jan. 30*th.*

ROYAL INSTITUTION.

With the parliamentary and fashionable season in London commence the Meetings of the Royal Institution; and just as we look to the debates in Parliament for an indication of the prevailing political views of the day, so do we gather from the evening discourses in Albemarle Street what have been the direction and results of recent scientific investigations. The Friday Evening Meetings of the Royal Institution are the best attended, most fashionable, and aristocratic of our scientific reunions. They are attended by the most eminent men of every department of science, who are surrounded by rank and talent of all grades—the more humble votaries of science seeking inspiration from exalted genius. Moreover, the character of the company influences that of the matter which from week to week is brought forward, for, in the presence of so many *savants*, mere popular illustrations of well-known facts, or anything common-place in the discourses, would meet with little encouragement; while, on the other hand, the accounts of the progress of science, which it is the immediate object of these meetings to give, are necessarily popularized, so as to render them intelligible to a mixed audience, a large proportion of which consists of patrons rather than professors of science. Hence it often happens that a subject, the dry scientific details of which had been received with cold reserve by some half a dozen or a dozen philosophers when first broached at a meeting of the Royal Society, will prove not only interesting, but highly popular, when dressed in the garb suited for the hundreds of ladies and gentlemen who throng the benches of the Royal Institution.

The meetings, as usual, commenced in the latter end of January, when they were opened, Jan. 23rd, by Mr. Tyndall, Professor of Natural Philosophy to the Institution, who delivered a discourse "On Glaciers." This was followed, on Jan. 30th, by the Rev. F. D. Maurice, "On Milton, considered as a Schoolmaster." On Feb. 6th, Dr. J. H. Gladstone took as his subject "Chromatic Phenomena exhibited by Transmitted Light." The lecturer explained and illustrated the results of an investigation in which he has been for some time engaged, showing that when a ray of light passes through a coloured solution, and is then analyzed by a prism, the resulting spectrum varies according to the nature of the coloured solution used, all the compounds of a particular base or acid having the same effect upon the light and producing the same description of spectrum. In this way he considers that the presence or absence of certain substances in solution may be indicated by the prism, and that this may prove a valuable aid to the ordinary processes of analysis in ascertaining the composition of bodies. On Feb. 13th, Mr. T. A. Malone delivered a discourse "On the Application of Light and Electricity to the Production of Engravings, comprehending a description of Photogalvanography." It was the object of the lecturer, in this communication, to explain a process which has recently attracted much notice, by which engravings are produced from photographic pictures by the application of electricity. The subject on Feb. 20th was "The Relation of Science to Ornamental Art," which was introduced by Mr. C. Dresser. On Feb. 27th, the chair was occupied by PRINCE ALBERT, and a discourse was delivered

ON THE CONSERVATION OF FORCE.

BY PROFESSOR FARADAY.

The object of this communication appeared to be to state certain difficulties which the author had experienced in reconciling the received definition of the force of gravitation with the principle of the conservation of force as recognized and applied in reference to every other form of physical force. The author said:—

"There is no question which lies closer to the root of all physical knowledge than that which inquires whether force can be destroyed or not. The progress of the strict science of modern times has tended more and more to produce the conviction that 'force can neither be created nor destroyed;' and to render daily more manifest the value of the knowledge of that truth in experimental research. To admit, indeed, that force may be destructible or can altogether disappear, would be to admit that matter could be uncreated; for we know matter only by its forces: and though one of these is most commonly referred to, namely, gravity, to prove its presence, it is not because gravity has any pretension, or any exemption, amongst the forms of force as regards the principle of *conservation*; but simply that being, as far as we perceive, inconvertible in its nature and unchangeable in its manifestation, it offers an unchanging test of the matter which we recognize by it.

"Agreeing with those who admit the conservation of force to be a principle in physics, as large and sure as that of the indestructibility of matter or the invariability of gravity, I think that no particular idea of force has a right to unlimited or unqualified acceptance, that does not include *assent* to it; and also to *definite amount* and *definite disposition of the force*, either in one effect or another, for these are necessary consequences: therefore I urge that the conservation of force ought to be admitted as a physical principle in all our hypotheses, whether partial or general, regarding the actions of matter."

And again:—

"Supposing that the truth of the principle of the conservation of force is assented to, I come to *its uses*. No hypothesis should be admitted, nor any assertion of a fact credited, that denies the principle. No view should be inconsistent or incompatible with it. Many of our hypotheses in the present state of science may not comprehend it, and may be unable to suggest its consequences; but none should oppose or contradict it."

"If," says the author, "the principle be accepted as true, we have a right to pursue it to its consequences, no matter what they may be. It is, indeed, a duty to do so. A theory may be perfection, as far as it goes, but a consideration going beyond it is not for that reason to be shut out. We might as well accept our limited horizon as the limits of the world. No magnitude, either of the phenomena or of the results to be dealt with, should stop our exertions to ascertain, by the use of the principle, that something remains to be discovered, and to trace in what direction that discovery may lie.

"I will endeavour to illustrate some of the points which have been urged, by reference, in the first instance, to a case of power which has long had great attractions for me, because of its extreme simplicity, its promising nature, its universal presence, and its invariability under like circumstances—on which, though I have experimented and as yet failed, I think experiment would be well bestowed: I mean the force of gravitation. I believe I represent the received idea of the gravitating force aright, in saying that it is *a simple attractive force exerted between any two or all the particles or masses of matter, at every sensible distance, but with a strength varying inversely as the square of the distance*. The usual idea of the force implies *direct* action at a distance; and such a view appears to present little difficulty except to Newton, and a few, including myself, who in that respect may be of like mind with him.

"This idea of gravity appears to me to ignore entirely the principle of the conservation of force; and by the terms of its definition, if taken in an absolute sense, '*varying* inversely as the square of the distance,' to be in direct opposition to it; and it becomes my duty now to point out where this contradiction occurs, and to use it in illustration of the principle of conservation. Assume two particles of matter, A and B, in free space, and a force in each or in both by which they gravitate towards each other, the force being unalterable for an unchanging distance, but varying inversely as the square of the distance when the latter varies. Then, at the distance of 10 the force may be estimated as 1; whilst at the distance of 1—*i. e.* one tenth of the former—the force will be 100: and if we suppose an elastic spring to be introduced between the two as a measure of the attractive force, the power compressing it will be a hundred times as much in the latter case as in the former. But from whence can this enormous increase of the power come? If we say that it is the character of this force, and content ourselves with that as a sufficient answer, then it appears to me we admit a *creation* of power, and that to an enormous amount, yet by a change of condition so small and simple as to fail in leading the least instructed mind to think that it can be a sufficient cause: we should admit a result which would equal the highest act our minds can appreciate of the working of infinite power upon matter; we should let loose the highest law in physical science which our faculties permit us to perceive—namely, the *conservation of force*. Suppose the two particles A and B removed back to the greater distance of 10, then the force of attraction would be only a hundredth part of that they previously possessed; this, according to the statement that the force varies inversely as the square of the distance, would double the strangeness of the above results; it would be an *annihilation* of force—an effect equal, in its infinity and its consequences, with *creation*, and only within the power of Him who has created.

"We have a right to view gravitation under every form that either its definition or its effects can suggest to the mind: it is our privilege to do so with every force in nature; and it is only by so doing that we have succeeded, to a large extent, in relating the various forms of power, so as to derive one from another, and thereby obtain confirmatory evidence of the great principle of the conservation of force. Then let us consider the two particles, A and B, as attracting each other by the force of gravitation, under another view. According to the definition, the force depends upon both particles, and if the particle A or B were by itself it could not gravitate, *i. e.* it could have no attraction, no *force* of gravity. Supposing A to exist in that isolated state and without gravitating force, and then B placed in relation to it, gravitation comes on, as is supposed, on the part of both. Now, without trying to imagine *how* B, which had no gravitating force, can raise up gravitating force in A; and how A, equally without force beforehand, can raise up force in B; still, to imagine it as fact done is to admit a creation of force in both particles, and so to bring ourselves within the impossible consequences which have already been referred to."

These quotations will serve to show the nature of the difficulty which the author experienced in the study of this subject. His views were fully explained and illustrated by reference to numerous phenomena in physical science, tending to show that, excepting in the case of gravitation, evidence was always obtained in favour of the conservation of force.

Having thus stated his difficulty, the author proceeded to say:—

"It will not be imagined for a moment that I am opposed to what may be called the *law of gravitating action*—that is, the law by which all the known effects of gravity are governed; what I am considering, is the definition of the *force* of gravitation. That the result of one exercise of a power may be inversely as the square of the distance, I believe and admit; and I know that it is so in the case of gravity, and has been verified to an extent that could hardly have been within the conception even of Newton himself when he gave utterance to the law: but that the *totality* of a force can be employed according to that law I do not believe, either in relation to gravitation, or electricity, or magnetism, or any other supposed form of power."

Unfortunately the subject was left in this unsatisfactory position, no new light being thrown upon it calculated to dispel the doubts or remove the difficulties to which reference had been made. But we may hope that the statement made is but the prelude to further and more successful investigations, which may afford means of reconciliation between the definition of the force of gravity and the principle of the conservation of force.

BOOKS RECEIVED.

FLORÆ CAPENSIS MEDICÆ PRODROMUS; OR, AN ENUMERATION OF SOUTH AFRICAN PLANTS USED AS REMEDIES BY THE COLONISTS OF THE CAPE OF GOOD HOPE. By L. PAPPE, M.D. Second Edition. Cape Town: 1857. 8vo. pp. 54.

SINCE its first appearance in 1850, this little work has undergone considerable improvement; several articles of the Cape Materia Medica not included in the first edition have been added, and a more detailed account of the uses of some has been introduced. The entire work now forms a very useful and interesting little manual of the medicinal plants occurring in the colony.

Few Cape drugs are employed in this country; but respecting these few, we naturally look to Dr. Pappe's book for information. In the case of Buchu Leaves, however, of the botanical origin of which we hoped to have found a precise account, our author does not give us much satisfaction. *Diosma crenata* De C. he cites as affording Buchu Leaves of the best quality, adding that *D. serratifolia* Lodd. and *Empleurum serrulatum* Sol. yield inferior varieties of the drug. Now in England the most esteemed Buchu Leaves are those afforded by *Barosma crenulata* Hook. and *B. serratifolia* Willd., and a less esteemed sort, those of *Barosma betulina* Bartl. As for the leaves of *Barosma crenata* Kuze (*Diosma crenata* De C.) we are not certain to have ever clearly identified them; and *Empleurum serrulatum* Ait. we have certainly never found at all, although we have looked for it repeatedly.

With all defects, however, Dr. Pappe's little work is a useful contribution, and one which we should be glad to see imitated in many other of our colonies.

ELEMENTS OF CHEMISTRY, THEORETICAL AND PRACTICAL. By WILLIAM ALLEN MILLER, M.D., V.P.R.S., Professor of Chemistry in King's College, London.

This work will be noticed in our next number.

ON PEPSINE. By M. BOUDAULT. Translated by W. STEVENS SQUIRE, Ph.D. London: Printed by C. Whiting, Beaufort House, Strand. 1857.

EPIDEMIC CHOLERA, DIARRHŒA, AND DYSENTERY; *pointing out an Effectual and Expeditious Method of Cure, &c.* By HENRY JEANNERET, M.D., &c. London: George Philip and Son, Fleet Street. 1857.

TO CORRESPONDENTS.

A. D.—(1.) We cannot find any notice of a patent granted to Jackson for the preparation referred to.—(2.) Thomas's *Practice of Physic.*

A. (Evesham).—The equivalents of the chemical elements given in Phillips's *Translation of the London Pharmacopœia of* 1836, which, we presume, is the work alluded to, are generally, but not entirely, those now in use by chemists.

J. L. (Bedford).—The discrepancies existing in different books in the statements of the equivalents of chemical elements, arise from two causes. First, there are slight discrepancies arising from differences in analytical results; the numbers being from time to time altered, in accordance with what are considered the most reliable results. Secondly, there are discrepancies—and these are more considerable in amount—arising from differences of opinion with reference to the constitution of chemical compounds. Thus, while some chemists consider the equivalent of mercury to be 100, others represent it as 200. The former chemists think that red oxide of mercury is a protoxide, consisting of one atom of mercury and one of oxygen; the latter think it is a binoxide, consisting of one atom of mercury and two of oxygen.

A. P. S. (London).—When sweet spirit of nitre has become acid, it is sometimes rectified from neutral tartrate of potash, which is preferred to calcined magnesia.

Inquisitor (Winslow).—In the mixture alluded to, the morphia would be precipitated in the state of a carbonate.

C. B. (Leeds) suggests that yellow bottles should be used for preparations which require to be kept from the light, the blue bottles sometimes used not answering the purpose. [The objection has been noticed before.]

B. A. (Lynn).—Balfour's *Manual of Botany.*

M. P. S. (Cambridge).—See page 488 of our last number.

J. R. (Spalding).—*Electro-magnetic Machine.* See vol. xii., page 333.

R. H. (Castle Hedingham) cautions country Members against a person travelling under the name of Wolfenberg, and selling a "Vermin Killer" under false pretences.

Acacia.—Liquid gum, if made with cold water, is not so liable to become acid.

M. P. S. (Brighton).—*Rosin Oil.* See vol. xii., pp. 345 and 389.

Heinrich (Wellingborough).—Yes.

T. (Ramsey).—(1.) We are not acquainted with the dose of *cyanuret of morphia.*—(2.) No.

A Student.—*Amylene.* See page 427 of our February number.

M. P. S. (Sunderland).—The price of the Prize Microscope of the Society of Arts is three guineas.

Belmont (Carlisle).—Glycerine should be free from smell, and about the same density as syrup.

R. M. (Guildford).—A small pocket microscope is sold by Pillischer, 88, New Bond Street.

F. W. (Sawbridgeworth).—We are unable to give the formula for Stedman's powders.

M. P. S. (London).—*Liquor Taraxaci* is generally prepared as follows:—℞ Expressed juice of taraxacum, three parts; rectified spirit, one part; mix, and allow the mixture to stand for twenty-four hours. Then decant and filter.

Botanicus (Warrington) is advised to study Botany, and take the chance of another prize being offered next year.

E. G.—The advertisement has been received, and will be used when an opportunity occurs.

M. P. S. (Putney).—We have no copy of Mr. Rawlings's formula for ginger beer.

J. W. (Nottingham).—(1.) No.—(2.) The nature of the change has not been accurately investigated, but it appears probable that margarine and mucilage are precipitated.—(3.) To render the decoction more purely demulcent.

ERRATA.—Page 459 of our last number, line 17 from bottom, *for* Mimosæ, *read* Mimoseæ; last line, *for* Carthartocarpus, *read* Cathartocarpus; page 460, line 19 from top, *for* Astragalus vera, *read* Astragalus verus.

Instructions from Members and Associates, respecting the transmission of the Journal, to the Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd) to Mr. CHURCHILL, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XVI.—No. XI.—MAY 1st, 1857.

MEDICAL AND PHARMACEUTICAL JURISPRUDENCE.

THE avowed object of the laws relating to Medicine and Pharmacy is the protection of the public against the evils of ignorance and fraud. The special purpose of each law is usually recited in the preamble, in which it is affirmed to be expedient for the "safety," "protection," or "advantage" (as the case may be) of the public that certain provisions should be enacted. Yet it is worthy of remark, that an extraordinary diversity exists in the mode in which it is sought to attain the same object in different countries, and even in different localities in the same country. This diversity may arise in part from the comparative estimates of the value of human life by the several parties concerned; but chiefly, we think, from the different degrees to which the theory of legislation is reduced to practice.

The law in France on these subjects is theoretically and practically more complete than it is in this country. Every person who prescribes or dispenses medicine must be educated and licensed for the particular duty which he undertakes. All medicines must be prepared according to the authorized Codex, and any deviation from this routine in any department of the profession is an offence directly punishable by law. It is not necessary to prove that a patient has sustained injury, or that a medicine has disappointed the prescriber by its defective quality; it is sufficient that an unlicensed person has performed an act for which a license is required, or that a medicinal preparation has been sold under a name which it does not correctly represent. The legal process is summary, and the evasion of the punishment difficult.

The French journals not unfrequently contain reports of cases; and the following examples, from the *Journal de Chimie Médicale*, will illustrate the stringency of the law against the irregularities to which we refer.

On the 14th of November, 1856, the members of the medical jury seized at the house of M. L——, Pharmacien at Merville, a quantity of a preparation represented to them to be "sirop antiscorbutique." The examination of this syrup proved that it had not been prepared according to the formula of the Codex. The proportion of wine was much less than that prescribed, and the flavour indicated that it had been prepared by cold maceration, instead of being distilled. These deviations enabled the maker to sell it at a much lower price than the genuine syrup.

M. L—— pleaded that he had received the syrup ready prepared from M. B——, Pharmacien at Lille, who was therefore summoned to the police court, on the charge of having fabricated and prepared a "sirop antiscorbutique" not in accordance with the formula of the Codex for this medicine, and in contravention of the 32nd article of the law 21 germinal (an xi.) of the ordonnance of 8th August, 1816, and the Act of Parliament of Paris of 23rd July, 1748.

The accused at first said that he had prepared the syrup according to *L'Officine*, a standard work by Dorvault. Then he maintained that he had sold it in the capacity of a Druggist, and not as a Pharmacien. He also pleaded some points of law in his defence, contending that the law under which proceedings had been taken was repealed by a subsequent one. The tribunal did not entertain the plea founded on a legal technicality, but maintained that the old law, enforcing obedience to the order of the Codex, was in full force. The plea that the original vendor was merely a Druggist, was not admissible; for in that capacity he could not legally prepare any medicinal compound, his functions being restricted to the sale of simple drugs. The tribunal therefore inflicted a penalty of 500 francs, with the costs of the process.

The *Journal de Chimie Médicale* for March, contains a report of the seizure of a number of medicines and preparations badly prepared or deteriorated. Several bottles containing distilled waters were found to consist either of common water, or of plain distilled water, without any of the aromatic principles of the herbs or flowers indicated on the labels. Another preparation, "sirop de quinquina," was proved by several tests to be very defective. A jar, labelled "Sel d'Epsom," was found to consist chiefly of sulphate of soda. The Court sentenced the party to fifteen days' imprisonment, and a fine of 50 francs.

Several cases are reported in which fines of fifty francs, with three days' imprisonment, were inflicted for the adulteration of coffee with chicory.

The power of visiting shops with a view of ascertaining the quality of medicines and punishing delinquents, nominally exists in this country. This power is vested in the College of Physicians, and is limited to a certain district of the metropolis. The Society of Apothecaries has also a very limited authority over the shops of Apothecaries. But these provisions for the safety of the public have become practically obsolete, and even as originally contemplated, their operation was so partial and limited as to be worse than useless.

It is a notorious fact, that flagrant violations of the law are prevalent in all branches of the profession, because there is no responsible party upon whom devolves the duty of taking proceedings, and almost every case that has come to our knowledge in which legal proceedings have been undertaken, has originated not in the impartial endeavour to promote the ends of justice, but in some personal rivalry between the defendant and the instigator of the suit. Several striking instances of this fact have been reported in previous numbers of this journal.

A curious case came under our notice lately. A poor man having cut his head, sent his wife to a Chemist for some plaster. She requested the Chemist to call and apply it, which he did, as an act of charity, making no charge. A day or two afterwards the wife requested the Chemist to call again and see her husband, and finding the cut inflamed, he urged her to send for a medical man. The patient being poor the Chemist requested a medical friend to call, and this gentleman handed over the case to the parish doctor, who attended until a cure was effected, which occupied two or three weeks. This latter gentleman, whose dispensary is situated within a few doors of the Chemist, represented to the patient that, by bringing an action against the Chemist for unskilful treatment in the first instance, he would recover compensation for loss of time during his illness; and an attorney was accordingly instructed to write a letter, giving notice that proceedings were about to be commenced. We have not heard the result.

In the case of which a brief report will be found in another part of this number, in which arsenic had been accidentally mixed with arrowroot, it was proved that the defendant, a grocer, was in the habit of keeping parcels of rice, oxalic acid, corrosive sublimate, jalap, &c., in the same drawer, under the care of an ignorant boy. Yet no remedy existed for this culpable negligence, nor would the fact have been noticed if a fatal accident, followed by an inquest, had not brought it to light.

When the notoriety of an inquest brings a question, involving culpable ignorance, negligence, or criminality before a jury, there is much inconsistency in the mode of estimating the degree of guilt or the amount of damage. In some Courts it has been stated, as an extenuating circumstance, that the defendant is an unqualified person, and therefore could not be expected to know any better. In other places such incompetence has been held to be an aggravation of the offence, the party having taken upon himself a responsibility for which he was not legally qualified.

In a case briefly noticed in our last number, in which a child was poisoned by laudanum, sold by mistake, the jury estimated the value of the child's life by the weekly price of her labour. This being stated to be five shillings per week, the damages were computed, at so many weeks' purchase, to amount to £15, and as the family resided with the grandfather, one shilling of the amount was awarded to him as his supposed proportion of injury from the loss of a tenant.

The mode in which sanitary regulations are enforced by the authority of medical officers of health under the recent Act for the removal of nuisances, is found in some localities very successful, and the principle might with advantage be carried out to a greater extent in analogous cases.

THE APPROACHING ANNIVERSARY OF THE PHARMACEUTICAL SOCIETY.

The legal difficulties and disputes which formerly gave rise to some fresh source of excitement at each Annual Meeting having now passed away, the circumstance chiefly to be apprehended is, that the Members may fall into the opposite extreme of apathy or indifference, under the impression that there is nothing more to be done. This is the natural course of events; and it was in anticipation of such fluctuations in the barometer of the Society, that, when the clause of the Pharmacy Act relating to the votes for Members of Council was framed, the London Members were purposely excluded from the privilege of voting by proxy or by voting-papers. Had this privilege existed at the present time, it is probable that our ensuing Annual Meeting would have been less numerously attended than its predecessors. We have heard several London Members complain of the trouble of attending the meeting merely for the purpose of voting; from which we infer, that, if they could have sent their votes by post, they would have neglected a public duty. It is a mistake for each Member to suppose that because he is a unit his absence will not be felt, for the meeting being composed of units, the prevalence of such an impression might reduce the meeting within a very narrow compass. It should also be remembered that subjects sometimes arise on the reading of the Annual Report which lead to interesting discussions. A country Member may have a grievance which has been bottled up for months, and the Annual Meeting affords a safety valve for relieving his mind from the pressure. In this manner, valuable suggestions are sometimes submitted to the Members, and, after due discussion, some amendment in the laws or regulations of the Society may be the result.

It was in consequence of a suggestion at one of the Annual Meetings, that the attendance of each Member of Council is now regularly reported, prior to the election of the Council for the ensuing year. In forming judgment on this return, due allowance should be made for circumstances, such as the locality or the state of health of individuals, &c. We regret to observe the non-attendance of our old and valued friend, Mr. Gifford, who is not a candidate for re-election, but who was one of our most regular attenders, until his declining health obliged him to relax in this duty. We are glad to observe among the new candidates, the name of Mr. Meggeson, one of the founders and constant advocates of the Society. In reference to the attendance of the Country Members of Council, it should be remarked that it is not necessary, or indeed desirable for those who reside at a great distance from London, to attend regularly. It is, nevertheless, very important, that such places as Edinburgh, Liverpool, Manchester, &c., should be represented in the Council, and that towns of secondary magnitude should be represented in turn, so as to extend the interest in the proceedings of the Society to all parts of the country. If those who reside at a considerable distance attend twice or three times in the year, this is quite sufficient, with occasional correspondence, to maintain the desired equilibrium; and as the business to be transacted at each meeting is notified on the summons, the Members have an opportunity of selecting those meetings at which their presence is most required.

While the representation of the country in this manner is a valuable element in the constitution of the Society, it should be borne in mind that the preponderance ought to be in favour of the London Members, otherwise the amount of labour would become so great as to be attended with some inconvenience. We may state from experience, considering the number of Committees and the frequency of meetings on various subjects, that with less than fourteen London Members of Council, the business of the Society could scarcely be efficiently conducted without undue pressure upon those who bear the burthen.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES (*continued*).

Elected in April.

MAJOR EXAMINATION.

Atherton, John Henry	Liverpool
Dixon, Henry	Grantham
Eyre, Joshua James	Manchester
Featherstone, John Peter	London
Glass, John	Ryde
Richardson, John George Frederick,	Longton
Rowell, Charles Frederick	Uppingham
Sarsfield, William	Durham

MINOR EXAMINATION.

Chrispin, William	Sand Hutton
Hallaway, John	Carlisle
Harrow, Henry	Tunbridge Wells
Judd, William	Brighton
Lee, John William	London
Pepper, Adolphus	London
Tieftrunk, Julius	London
Tuck, John	Trowbridge

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH	TOWNS.
Bell, Alfred	Mr. Noakes	Brighton
Brown, Edward	Mr. Dutton	Birkenhead
Davies, Robert John	Mr. Roberts	Aberystwith
Machon, Edward	Mr. Parkes	Manchester
Syer, John Witham	Mr. King	Soham
Truman, George F.	Mr. Wellington	Oakham
Watson, Richard T.	Mr. Dobinson	Bishopswearmouth

PHARMACEUTICAL MEETING,

Wednesday, April 1st, 1857,

MR. JACOB BELL, PRESIDENT, IN THE CHAIR.

THE following donations were announced:—

Journal of the Society of Arts, from the Society.
Journal of the Photographic Society, from the Society.
Insecta Britannica, vol. iii., from Mr. John Clifford.
Butterflies of Great Britain, from Mr. John Clifford.
Westwood *On Insects*, 2 vols. 8vo, from Mr. John Clifford.
Wood's *Index Entomologicus*, 8vo, from Mr. John Clifford.
Entomologist's Companion, from Mr. John Clifford.
Entomologist's Annual, 3 parts (55, 56, 57), from Mr. John Clifford.
Moore's *British Ferns*, from Mr. John Clifford.
Medical Literature, by Dr. Dobell, from the Author.
Archives du Museum (tome ix.), from the Author.
Le Quinquina Rouge, by M. Guibourt, from the Author.
The Quarterly Journal of Dental Science, from the Proprietors.
A specimen of Vanilla Fruit from the Mauritius, from M. Pouperiel de Valancé

DETECTION OF STRYCHNINE WHEN ADMINISTERED IN DOSES LESS THAN SUFFICIENT TO CAUSE DEATH.

Dr. **Garrod** said that, having seen in the *Pharmaceutical Journal* that the question had been discussed, at a recent meeting of the Society, whether strychnine could be detected in the urine of a patient to whom the alkaloid had been administered in quantity less than sufficient to cause death, he wished to mention a case which had occurred within his own observation. Having a patient at the hospital to whom strychnine was administered in doses of one-eighth of a grain three times a day (the quantity having been increased up to this point), the urine of twenty-four hours was collected and examined by Mr. Rodgers's process, and most satisfactory evidence of the presence of the strychnine was obtained. In this case the strychnine was given in medicinal doses, and it was therefore one of those cases in reference to which it had been stated that the alkaloid could not be detected.

Mr. A. F. **Haselden** brought before the meeting the subject of

THE PREPARATIONS OF ARSENIC EMPLOYED IN MEDICINE.

In introducing this subject, he said he had nothing new to offer with reference to the medicines he was about to notice, but he thought some benefit might result from a discussion of the relative merits of the different compounds or preparations of arsenic used in medicine, with the view of eliciting the opinions of those present as to which of them ought to be ordered in our Pharmacopœia. At present there were only two preparations of arsenic in the London Pharmacopœia, while there were several others frequently used in medicine, and ordered in other Pharmacopœias. He proposed briefly to describe or refer to the principal arsenical compounds in use, so as to bring the subject fairly before the meeting, and present the points upon which the expression of opinion was desired.

Liquor Potassæ Arsenitis, of the London Pharmacopœia, claimed the first notice, from the fact of its having maintained its position through several generations of Pharmacopœias, and of its being more generally used by English medical practitioners than any other arsenical preparation. By many medical men this was the only preparation of arsenic ever prescribed, but whether this circumstance arose from their considering it superior to all the others, or from their being unwilling to try the effects of any new preparations of so powerful an agent as arsenic, he was unable to say. There appeared to be a difference of opinion as to whether this preparation was rightly called an arsenite of potash or not, some persons contending that the old name of *Liquor Arsenicalis* was a more correct one.

Liquor Arsenici Chloridi had been introduced into the London Pharmacopœia of 1851 for the first time. It was understood to be intended to represent an old preparation, known as De Vallenger's mineral solution. It was a solution of 1¼ grain of arsenious acid with a little hydrochloric acid in one ounce of water. This and the preceding preparation constituted the only compounds of arsenic ordered in the London Pharmacopœia. Being both in the liquid form, it was to be regretted that they were not of the same strength.

Among the preparations not contained in the Pharmacopœia, there were—

Liquor Sodæ Arseniatis (Pearson's Solution), and *Liquor Ammoniæ Arseniatis.* These were solutions of either salt, in the proportion of four grains to the ounce; being the same relative strength as the Liquor Potassæ Arsenitis, over which it was questionable whether they possessed any advantage.

Arsenici Iodidum, or, as it was sometimes called, *Arsenici Teriodidum*, was ordered in foreign Pharmacopœias, where instructions, not all alike, were given for its preparation. This compound was sometimes used in this country, although not recognized in our Pharmacopœias. A solution of two grains to an ounce of water was found to keep without change, but in a stronger solution a precipitate formed. The author stated that he had tried both glycerine and sugar for preventing the decomposition and precipitation which occurs in the stronger solution, and found sugar to succeed better than glycerine. He had also obtained a similar result with iodide of iron.

Liquor Arsenici et Hydrargyri Hydriodatis, or, as it was sometimes called, *Donovan's Solution*, had been used to some extent, and a formula for it was now given in the Dublin Pharmacopœia. Several modifications in the process for its preparation had been suggested since it was first introduced by Mr. Donovan. The most simple process was that of the United States Pharmacopœia, where iodide of arsenic and red iodide of mercury were directed to be rubbed together with water, and the solution completed by the application of heat.

Quinæ Arsenias, and other compounds of quinine and arsenic, were sometimes ordered in medicine, but there were no formulæ for their preparation in any of the Pharmacopœias.

Ferri Arsenias, obtained in the form of a dirty green precipitate, on adding arseniate of soda to sulphate of iron, was the last of these preparations to which he would refer.

Having thus brought the different medicinal preparations of arsenic under notice, he thought it worthy of consideration whether any of them, not at present contained in our Pharmacopœia, ought to be introduced there. Arsenic was described by medical writers as a valuable remedial agent, especially for skin diseases and for ague. In the Pharmacopœia of the Hospital for Diseases of the Skin, there were no less than seven different preparations containing arsenic, ordered for internal administration. He might also refer to the popular use said to be made of arsenic in some parts of Lower Austria, where, according to the late Professor Johnstone, it was extensively used by the common people, with the view of improving their personal appearance.

The author concluded with the following remarks: "To return to our subject, would it be advisable to add any of the preparations I have noticed to the future Pharmacopœia? Differences of opinion no doubt exist with reference to this question, and on this account I have introduced the subject for discussion here. It may be urged that the profession have the simple substances and can unite them as they please, but, on the other hand, it is well known that few remedies are much employed until introduced in some well-defined and manageable form. Again, it may be said, that if every preparation used in medicine were introduced into the Pharmacopœia, this work would be rendered too voluminous; but I think that a work for the guidance of every branch of the profession, from the Physician to the Pharmaceutist, cannot contain too large an amount of instruction and information up to the latest date, for it would be far more convenient to refer to one volume for the information required, than to have to search through many works, including journals and pamphlets."

Mr. Bell said the object of the communication which had just been read appeared to be to extend the use of arsenic. On a former occasion, when the subject of arsenic was discussed there, the object had been to restrict its use. It was certainly desirable that the Pharmacopœia should contain the best preparations for its administration, but not, he thought, that the number of such preparations should be multiplied.

Mr. Hanbury thought, judging from prescriptions in which arsenic was ordered, that there was no occasion for any other preparation than the old liquor arsenicalis, as the use of the other preparations was confined to a very limited number of medical men.

Dr. Garrod perfectly agreed with Mr. Hanbury. He thought that one good preparation of arsenic was sufficient, the effect, as far as the arsenic was concerned, being the same whatever its state of combination might be. Liquor potassæ arsenitis answered the purpose very well, as also did the liquor arsenici chloridi of the London Pharmacopœia. He had given both to the same patient, and could not detect any difference in the effects, but he thought, if both were retained in the Pharmacopœia, the strength ought to be equalized. He believed the arsenic existed in both preparations as arsenious acid, which was simply dissolved, in one case in solution of carbonate of potash, and in the other case in hydrochloric acid.

Dr. NORMANDY mentioned some cases, which seemed to show that the effects of arsenious acid were not always to be depended upon.

Mr. REDWOOD had been glad to hear the opinion expressed by Dr. Garrod, with whom he entirely concurred. He thought there could be no doubt that the two preparations of arsenic of the London Pharmacopœia contained the arsenic in the same state, namely, as arsenious acid, but associated with different solvents, carbonate of potash being used for this purpose in one case and hydrochloric acid in the other. The latter of these seemed least liable to objection, as the medicine would be likely to meet with free hydrochloric acid in the stomach. If, in liquor arsenicalis, the arsenious acid required the carbonate of potash to increase its solubility, this effect would necessarily cease when it came into the acid contents of the stomach.

Dr. RADCLIFFE wished to remark, with reference to the allusion which had been made to the use of arsenic in Austria, that there was reason to believe the accounts published in this country, which had excited so much astonishment, were not correct, and that no such practice existed as that described by the late Professor Johnstone in his popular work on Chemistry.

Mr. BELL referred to the practice among grooms of giving arsenic to horses with the view of improving their coats and general appearance, which seemed to strengthen the assumption that it might be used for a similar purpose by human beings.

KNIGHT'S SODA WATER APPARATUS FOR AERATING LIQUIDS.

THESE machines were brought before the notice of the meeting, their various parts exhibited, and their construction fully explained, by the inventor and patentee, Mr. Richard Knight, of Foster Lane, London. They are made of three sizes: half-gallon, or table size, as represented by fig. 1; two gallon and four gallon sizes, as represented by fig. 2. The materials of which they are constructed consist of pure tin and silver, which renders a contamination of the aerated water with any foreign ingredients an impossibility. The manufacture is simple and solid, and the manipulation required in working them is exceedingly easy, so that all fear of derangement is removed, and durability ensured; at the same time, should they meet with any accident, they are easily and cheaply repaired.

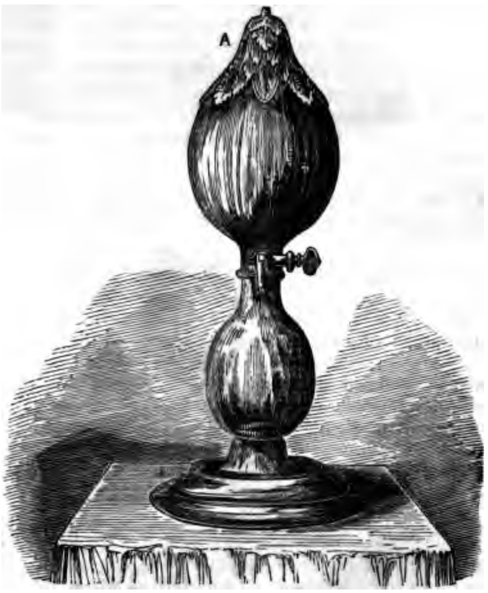

FIG. 1.

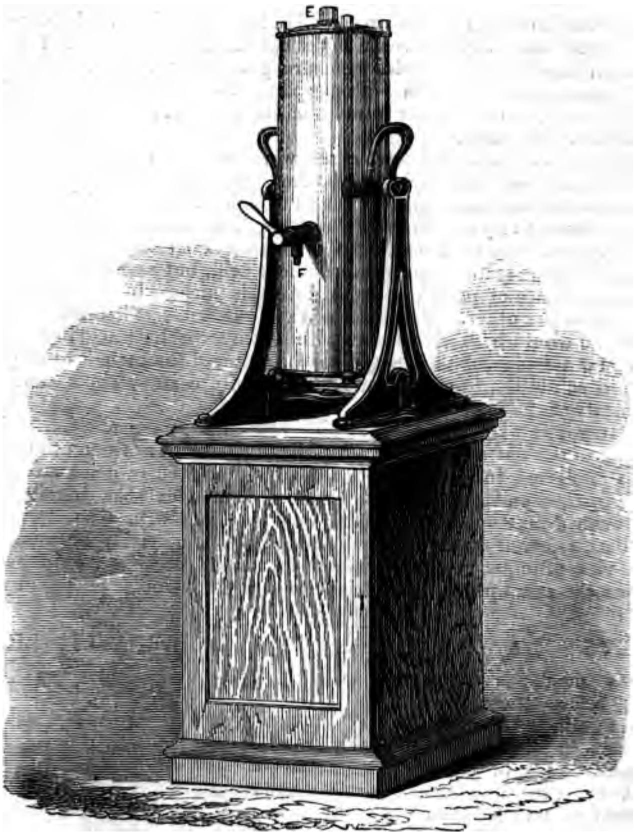

FIG. 2.

☛ The time required for bringing the aerated water to perfection by either of the apparatus is half an hour. Figs. 3 and 4 show the process of agitating the

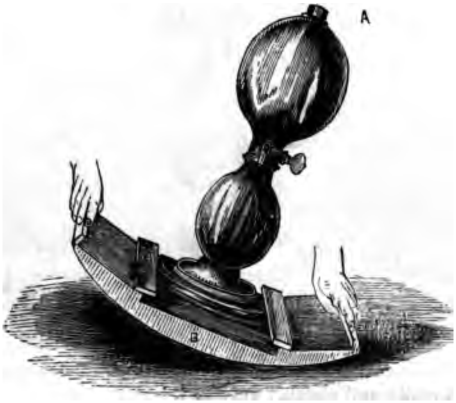

FIG. 3.

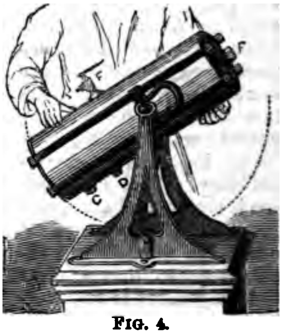

FIG. 4.

machine, so as to ensure a complete absorption of the carbonic acid gas, which, owing to the great solidity of the manufacture, is capable of being condensed under considerable pressure with perfect safety. This mode of agitating or breaking the water during the evolution of the carbonic acid gas is of so thorough and complete a kind, that the absorption of gas obtained is greater than is effected by any other process.

The soda water, when made, may either be drawn off at pleasure, as from a fountain; bottled off at the rate of twenty to thirty dozen per day; or retained in the machine for weeks or months together, without any fear of deteriorating in quality. No movement or agitation can interfere with the working of the machines, so that they can be used at sea on board any vessel with the same certainty of success as on land. They can also, when charged, be conveyed from place to place without any fear of derangement. The two-gallon and four-gallon machines, mounted on a pedestal with cocks, as shown in fig. 2, can be easily wheeled from one part of a room to another.

The construction of these machines appeared to be generally approved by the Members who examined them. It was suggested that they should be exhibited in operation at the Conversazione in May, when Members would be able to judge of their effects.

PHARMACEUTICAL SOCIETY,

NORTH BRITISH BRANCH.

The last Meeting for the present Session of the Pharmaceutical Society in Edinburgh was held in the rooms, 50, George Street,

MR. W. FLOCKHART, VICE-PRESIDENT, IN THE CHAIR.

DESCRIPTIVE NOTICE OF SOME FRENCH PHARMACEUTICAL SPECIALITIES,

WITH SPECIMENS PRESENTED TO THE SOCIETY BY MR. D. S. KEMP, ASSOCIATE, AND RESIDENT IN PARIS.

Communicated by Mr. H. C. Baildon.

Thinking it probable that Mr. Kemp, from the favourable position occupied by him in Paris, might be able to contribute some interesting information connected with French pharmacy, I some time since wrote to him on the subject. In reply, he promised to do so; and, in February, I had a letter from him, in which he says: "The usual pressure of business at this season has prevented me fulfilling my promise until now of sending you some matter or other for communication to the Pharmaceutical Society; I hope, however, it is not yet too late for the season. Finding it quite out of my power at this time to get up anything like a scientific article, I have sent one or two specimens of French Specialities, with a written notice of each, which may possibly interest some of the members of the Society." He continues: "I am really sorry that I have not been able to send you something more deserving of your attention; but I think I may promise you some matter possessing the merit of originality, if I am spared till next session." In continuation, he writes:

" This communication is not intended as more than a descriptive notice of the few specimens of French Pharmaceutical Specialities which it accompanies. These are only a selection of the most elegant, from a vast number of others well known in France, and many of which are a source of no little pecuniary gain to their proprietors.

" Those of the selection in the form of pills are three in number; two of them preparations of iron, and the third of digitaline.

" The 'Pilules de Vallet,' or Vallet's Pills, contain the proto-carbonate of iron in a perfect state of preservation. This is effected by the following process:—The sulphate of iron and carbonate of soda are dissolved in water containing a sixteenth of its weight of simple syrup; the precipitate, washed with water and syrup in the same proportions, and expressed in a cloth saturated with syrup, is well mixed with honey, and evaporated to a proper consistence for pills; the pills are afterwards silvered and kept in bottles, and contain each about a quarter of a grain of protocarbonate of iron along with a little inert powder. They are beautifully finished, and preserve their shape for any time.

"The 'Pilules de Blanchard' contain the protoiodide of iron. They are prepared by evaporating a solution of iodide of iron (prepared in the usual way with iodine and iron filings) along with honey to a thick consistence, and forming a mass by the addition of a little marsh mallow and liquorice powder. In the process, the greatest care is taken to prevent the decomposition of the iodide; the pills are rolled in powder of iron and on an iron-pill machine, and are finally varnished with a solution of balsam of tolu in ether. Each pill contains one grain of protoiodide of iron and a sixth of a grain of metallic iron.

"The granules of digitaline form a convenient method of administering that powerful medicine, each containing one milligramme ($\frac{1}{60}$th of a grain) of digitaline, mixed with powdered sugar.

"The 'Dragées (or Bonbons) de Gille' contain also the protoiodide of iron, about one grain in each. It is contained in a pill in the centre of the dragée.

"The method of their preparation is too obvious to require explanation. It is a form of medicine more suited to the French than to the British taste.

"The next form of medicine shown in the specimens is the most elegant of all.

"The 'Perles d'Ether' and 'Perles de Terebenthine,' are small gelatine capsules, containing respectively pure ether and turpentine; they are prepared by a process kept secret by the proprietor, and are of unequalled beauty and finish; each contains from four to five minims of sulphuric ether or oil of turpentine.

"The capsules of Mathey-Caylus and Raquin are both very fine illustrations of the perfection to which the process of capsulation has been brought.

"Those of Raquin contain copaiva thickened with $\frac{1}{32}$ of its weight of magnesia, and those of Mathey-Caylus are prepared with pure copaiva, copaiva and citrate of iron, copaiva and cubebs, and five other combinations of the same medicine, as well as Venice turpentine.

"The specimen sent contains copaiva with citrate of iron, a very useful combination.

"The capsules of both makers are composed of gluten from oat flour, not gelatine.

"If some of these preparations were manufactured by English or Scotch Pharmaciens, they would probably obtain a reputation equal to that which they hold in France.

"*6th February*, 1857." "D. S. KEMP.

ON AN IMPROVED METHOD OF COATING PILLS.

BY MR. BAILDON.

I think, Sir, that you will agree with me, that these specimens are very interesting, and that they demonstrate how very far our ingenious neighbours are before us, even in the mechanical part of our profession. I have never before seen anything at all to compare with the elegance and beauty of finish manifested in the Perles d'Ether. The method of coating pills used by Mons. Blanchard might be applicable not only for all pills kept ready made for sale, but also modified in a way I shall immediately allude to, for pills made to prescriptions, not only to prevent them from hardening, but also most effectually to cover any unpleasant taste or smell. A solution of balsam of tolu in ether (Mons. Blanchard's method) I did not find sufficiently volatile, as pills coated with it took upwards of three hours to dry, but by using chloroform as the solvent in the proportion of a dram of the balsam to three drams of chloroform, twenty minutes was quite sufficient to make the pills non-adhesive. I have brought specimens of pills varnished with the two solutions named. The chloroform and balsam solution is not only preferable from the shortness of the time required to complete the process, but the pills have a much more finished appearance. The superiority of this method of preserving pills over any kind of powder, appears to me very great, and it is also certainly preferable to the coating of pills with silver leaf. It will, I am satisfied, be found more effectual in preserving pills soft as well as in covering the taste and smell of the drugs used.

Professor Christison states in the introduction to his Dispensatory, "A few years ago it was ingeniously proposed in France to cover pills with gelatine by dipping them into a solution of bone-gelatine or isinglass. The method is troublesome, but otherwise answers well with most pills." The process just described is equally efficacious, and is attended with but little trouble.

The process was then shown. It consisted in placing a few drops of the solution in a suitable box, shaking the pills in it, and then turning them upon a slab, and so placing them that one pill did not touch another. In a few minutes they were quite dry.

The CHAIRMAN read a letter from the President (dated 28, Dundas Street, April 14, 1857) stating, that being still too much of an invalid to be able to attend the closing meeting of the Pharmaceutical Society for this session, he could not allow the opportunity to pass without expressing his great regret at having been prevented from attending to his duties as Chairman during the winter. He alluded to several papers of importance which had been read by various Members of the Society during the session; and ventured to predict that their number would ere long be considerably increased, being persuaded that there is a mine (as yet unexplored) where valuable materials may be worked out. He alluded especially to country Members and Associates. Many of them, he felt assured, were well able to furnish papers.

A paper was read by Dr. Stevenson Macadam, F.R.S.E., on the "Detection of Strychnine, with special reference to the recent wholesale Poisoning of Dogs in the neighbourhood of Perth." An interesting discussion followed the reading of this communication.

Dr. Macadam read the Report regarding the Examination of the Pharmaceutical Students who attended his winter course of Lectures on Chemistry, and stated Mr. Duncan McCabe, Apprentice to Mr. Macfarlan, as the successful candidate for both Prizes, viz., that for the best Essay on the Chemistry of Food, and the other for the best Answers to Written Queries. Mr. Flockhart then, in the name of the President, by whom these Prizes were given, handed them, with a short address, to Mr. McCabe. The volumes presented were Gray's "*Supplement*," by Redwood; and Thomson's "*Cyclopædia of Chemistry*."

The meeting was very numerously attended, and the proceedings of the evening appeared to give satisfaction to all present.

THE ANNUAL MEETING

Was held on the following day in the same rooms, at two o'clock,

MR. FLOCKHART IN THE CHAIR,

In the unavoidable absence of Mr. Robertson.

The SECRETARY, being requested, read the following Annual Report:—

The Council have now the pleasure of laying before this the Annual Meeting of the Pharmaceutical Society, a report of the affairs and progress of the Society in Edinburgh during the past year, and the Session now about to close.

Evening lectures on Chemistry were commenced by Dr. Stevenson Macadam, as advertised, in the Society's rooms early in November, 1856; but, as the number of pupils offering was small, Dr. Macadam made a proposal to the class to admit to his daily prelections in the School of Arts such students belonging to the Society as held his perpetual tickets, as well as all those who had determined to attend the evening course, and this on terms certainly very advantageous to them, and for which the Council think Dr. Macadam well entitled to the thanks of the Society. Of this kind offer eight of the Pharmaceutical students gladly availed themselves.

Early in the Session it was thought advisable to move the museum and lecture-room from 72, Princes Street, to 50, George Street. The Council think increased accommodation has thus been gained, while those who have attended any of the scientific meetings, or who may now be present, will be able to judge of the propriety of the change. By this removal there will be a saving in the annual rent; and it is proposed, in the course of the summer, to add considerably to the library and very probably to the museum, so as to keep up an interested feeling towards those two important branches of the Society in Edinburgh. It may further be mentioned, as the request of several members, that representations will be made to the Council in London regarding duplicate specimens, which must of necessity from time to time accumulate on their hands. Were such specimens transmitted to Edinburgh it is thought that, at very trifling expense, valuable assistance would be afforded in extending and improving the museum here.

The printed statements which have from time to time appeared in the Journal will best show what has been done at the different meetings held here during the winter months. There have been five scientific meetings, and, while the Council thank those gentlemen who have lent their aid and assistance, they hope next Session to be able to establish a regular series of monthly meetings, and thus increase the number during each Session to six. Members and Associates are strongly urged to contribute towards these reunions. Any suggestion for the extension or improvement of these meetings will be gladly entertained by the Council, and it will be gratifying to find from increased attendance that these meetings are viewed as opportunities for keeping up the harmony and good feeling existing in the Society, as well as evincing a desire on the part of its well-wishers to contribute towards the instruction of those connected with the association.

The thanks of the Society are tendered to those gentlemen who have taken charge of the Library and Museum.

The Council beg especially to draw the attention of Members to the fact, that at every sitting of the Board of Examiners, opportunity is afforded for Apprentices joining the Society as Registered Pupils, either by personal appearance before the Board in Edinburgh, or, in event of residing in the country, by certificate of classical attainments from a clergyman, or other party competent of judging. Six pupils have thus been admitted at the two last examinations, and the Council will be glad to find such candidates coming forward more abundantly, as they believe the chief support given in future to the Pharmaceutical Society must arise from young Pharmaceutists, who, it is hoped, will not fail to profit by the comparative facilities now afforded of becoming thoroughly acquainted with the scientific department of their business.

In reference to inquiries regarding the Register Fund Prize, the Council take this mode of intimating to the Associates and Apprentices of the Society throughout Scotland, that the same subject, namely, "*On the Best Mode of Preparing Tinctures*," is again fixed upon as the competing essay. All papers are therefore requested to be forwarded to the Secretary in Edinburgh, not later than the 1st of October; and it is hoped that the number and character of some of these essays will be such as to enable the Committee to award the Prize, which has now been in abeyance for the last two years.

The Council think this a fitting and good opportunity for drawing the attention of country Members generally to the inquiry lately made by the Highland Society of Scotland, as to whether the Council could recommend any Member of the Pharmaceutical Society, residing in agricultural districts, as possessing sufficient knowledge of Analytical Chemistry to enable them to examine and test, for the purpose of ascertaining the purity of such substances as guano, gypsum, nitrates of soda and potash, ammoniacal salts, oil cake, bone dust, superphosphate of lime, and other articles now so extensively employed by farmers and proprietors for the improvement of land. Impressed with the idea that much good might accrue, if some parties were found disposed to declare themselves willing and able to undertake these duties, the Council have taken steps to ascertain the feelings of the country Members throughout Scotland in reference to this matter, in the conviction that, under the auspices of the Highland Society, the present movement may become more important than might at first sight appear; and they therefore hope due attention will be paid to the circulars which have been so lately issued, as much will depend upon the nature of the replies received, whether anything can really be substantially done to meet the wishes of the Highland Society on the point now before the Council for consideration.

The following is a statement of the Secretary's intromissions with the funds of the Society, commencing 1st January, 1856, and terminating 30th December same year:—

Dr. *The Pharmaceutical Society in account with the Secretary.* *Cr.*

Dr.	£	s.	d.	Cr.	£	s.	d.
To paid Insurance of Museum and Library	0	7	6	July. By Cash	50	0	0
Do. Water Duty	0	5	6	Dec. 30. Balance due Secretary	2	16	8½
Do. Rent of Rooms, less Taxes	22	18	2½				
New Shelving, Furniture, &c.	9	6	0				
Advertizing	1	1	9				
Postage	2	9	1				
Expenses at Annual Meeting	1	16	6				
Gas Account	3	3	4				
Printing	3	18	0				
Gas Fittings	1	3	1				
Painter's account	0	17	3				
Taxes, including landlord's proportion	3	10	6				
Delivering billets and attendance of Porter at Meetings	1	14	6				
Stationery	0	5	6				
	£52	16	8½		£52	16	8½
1856 Dec. 30. Balance due Secretary	£2	16	8½				

Edinburgh, 16*th April*, 1857.

We, the undersigned, have examined the foregoing account with vouchers attached, find them correctly stated, and the balance due to the Secretary, as at 30th December, 1856, to be two pounds sixteen shillings and eightpence sterling.

H. C. Baildon,
Wm. Ainslie,
J. F. Macfarlan.

The Council beg particularly to express their sympathy with the President, Mr. Robertson, who for a period of nearly three months has been confined to the house with severe and painful illness. While they are glad to know that he is now convalescent and rapidly recovering, and while they further sincerely hope that restoration may be speedy and complete, they cannot but regret that, in consequence of this affliction, his valuable asistance has been unavoidably lost to the Society for so long a period.

The Council have great pleasure in testifying the high sense they entertain of the value of the labours of the Secretary, Mr. Mackay. To his unwearied and zealous exertions it is mainly owing that the Society has been able to maintain its efficiency, and to a continuance of his valuable services they look for an increase of its prosperity.

The Council, in conclusion, are sorry that they are not in a position to make further remark regarding progress in obtaining a National Pharmacopœia. Every day continues to render more and more manifest the desirableness of such a publication, and believing as they do that this work would be hailed as a great boon by Medical Practitioners and Pharmaceutical Chemists, they are quite certain every assistance will be readily afforded by the Society, if considered requisite, in cooperating to complete so valuable a production as a Pharmacopœia, emanating from the united Colleges of England, Scotland, and Ireland.

Mr. **Currie** (of Glasgow) moved the adoption of the report, which was carried *nem. con.*

Mr. **Macfarlan** moved that Mr. Flockhart be elected President, and Mr. Brown of Dunfermline, Vice-President for the ensuing year—carried unanimously.

Mr. **Aitkin** proposed as Members of Council, the President and Vice-President, Messrs. Ainslie, G. Blanchard, Robertson, Young, Tait, Steele, Lindsay, Gardner, Macfarlan, Dron of Kirkcaldy, Mr. Hart of Glasgow, and Mr. Mackay—carried *nem. con.*

The following were also nominated as Examiners: the President and Vice-President, Messrs. Robertson, Baildon, Gardner, Tait, Macfarlan, Mackay, the President and Vice-President of the Society in London *ex officio.*

The **Chairman** moved that Mr. Macfarlan be nominated as the representative Member of Council in London.

Mr. **Brown** moved as the Directors of the Museum, Messrs. Ainslie, Young, W. Baildon, and W. Macfarlan—carried.

Mr. **Baildon** moved, and Mr. **Macfarlan** seconded the re-election of Mr. Mackay as Secretary—carried by acclamation.

Mr. Brown having alluded to a recent communication of the Highland Society on the subject of the analysis of guano,

Mr. Mackay explained that, in the course of a correspondence between an eminent Chemist in the west country, Mr. Hall Maxwell, and Professors Christison and Wilson, Mr. Maxwell had inquired whether there were any Chemists throughout the country who were capable of analyzing guano. A doubt having been expressed on the subject, application was made to the Council of that Society, who had issued a circular with a view of ascertaining to what extent the Members would be able and disposed to afford the assistance desired. Only a few replies had as yet been received, but the result would be duly announced as soon as the answers from the other parties had come to hand.

A vote of thanks to the Chairman terminated the proceedings.

THE ANNUAL DINNER

was held in Young's New Royal Hotel, Princes Street, at half-past five on the same evening. Mr. Flockhart, President of the Society, was Chairman; and Mr. Brown, of Dunfermline, Croupier.

After the usual loyal toasts, Mr. Brown proposed "The Pharmaceutical Society." He alluded to the origin of the Society, with comparatively few but large-hearted and far-seeing supporters, who, by their assiduity and perseverance, had surmounted the discouragement which beset them, and had thus obtained, first a Charter, then an Act of Parliament. The latter, he said, was but a loose robe, thrown round the Society by way of distinction. They were only beginning to bud, but in course of time would blossom and bear fruit. Already the Society had done much in raising the tone of Pharmaceutical education, and improving the standard of medicinal preparations. There were still some difficulties to be encountered, but by perseverance they would surmount them, and extend the influence of the Society throughout the kingdom. He concluded by some practical remarks on professional education as the groundwork of the prosperity of the Society and the credit of its Members.

Mr. Currie, of Glasgow, proposed "The Board of Examiners and Council in Edinburgh," with some appropriate comments on the functions of the Board, and the stimulus of the examinations in promoting industry and improved qualification.

Mr. Macfarlan proposed "The University of Edinburgh," which, he said, although comparatively young, had outstripped the sister universities of Oxford and Cambridge. In every quarter of the globe some of the alumni of the University of Edinburgh were to be found filling places of distinction, and reflecting credit on the source of their education. Passing from such names as Cullen and Black, and others who were gone, he might refer to the Honorary Members of the Society, who were elected on account of their distinguished merit, and for whose services they had reason to be grateful. Mr. Macfarlan concluded by some effective allusions to the great strides the University and its professors had made in education, and in all that relates to the scientific, moral, and intellectual development of the mental faculties.

Mr. Young proposed "The Colleges of Physicians and Surgeons," and Mr. D. R. Brown proposed "Pharmaceutical Education."

Among the other toasts were "The Honorary Members," "The Retiring President, Mr. Robertson," "The President and Council in London," "Dr. S. Macadam," "The Chairman," "The Croupier," "The Secretary."

Want of space obliges us to condense this report, which arrived rather late.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Thursday, 26th March, 1857.

MR. ABRAHAM, THE PRESIDENT, IN THE CHAIR.

The Secretary, Mr. Mercer, announced donations to the library of the *Report of the Society of Arts* from Dr. Hume, and twelve volumes from himself. The following paper was then read by George Hamilton, Esq., F.C.S., F.R.A.S.,

ON THE CONSERVATION OF FORCE.

It must be extremely gratifying to all Chemists to observe that our distinguished countryman, Professor Faraday, has turned his attention to the subject of the conservation of force. So acute and able a philosopher cannot fail to leave behind him some new light to guide those who follow in the same path of investigation.

The lecture lately delivered by Professor Faraday has been so reported in the public journals as to represent the doctrine of the conservation of force as the result of the professor's own most recent researches, and now for the first time publicly announced; and further, that it subverts the Newtonian law of gravitation, and establishes a new theory of the universe. I have so strong a faith, not only in the ability, but in the philosophic cautiousness and integrity of the learned professor, that I at once reject the report as inaccurate, and proceed to make a few observations.

The subject was first brought before the British public by Grove, in a lecture delivered at the London Institution in 1842, and more fully expounded in a course of lectures in 1843. These lectures were afterwards remodelled, and published in the form of an essay, under the title of *The Correlation of Physical Forces*. On page 16 of that essay the author states that it is an irresistible inference from observed phenomena that a force cannot originate otherwise than by devolution from some pre-existing force or forces; and on page 4 he says, "The extent of claim which my views on this subject may have to originality must be left to the judgment of the reader: they became strongly impressed upon my mind at a period when I was much engaged in experimental research, and were, as I then believed, and still believe, *new*."

The labours of Joule, and the profound investigations of Thomson, on the subject of heat must be regarded as part, and a very important part, of the history of this comparatively new doctrine, since they aim at assigning to the forces on which they treat quantitative relations, without which no accuracy can be attained in any branch of physical inquiry.

A force may be defined to be that which moves or tends to move a body, or which stops or tends to stop the motion of a body. If a body, A, moving along a plane, strike another body, B, there are two things connected with the phenomenon which our faculties are fitted to observe and reason upon—matter and motion; or, if we proceed with the analysis to its utmost limit, we may resolve the idea of motion into the ideas of matter, time, and space. We have no idea of a separate and distinct thing—force. If A moves with greater speed it strikes B with greater force; that means, that, after impact, it is observed, in the same given time, to move over a greater space than in the previous experiment.

The term "motion" involves the idea of body, time, and space, and expresses a certain qualitative relation between them. The term "force" embraces the same three ideas, and expresses a certain quantitative relation between them. If, then, we know nothing of force in the abstract, it is evident that we can know nothing of distinct species of force. The terms "electrical force," "magnetic force," "affinity," are convenient to indicate loosely classes of conditions under which the movements of matter take place. Let any one try to point out the essential distinction between any two of them, and he will find that he is grappling for a metaphysical *entity*, or rather nonentity, which always eludes his grasp. When we can fairly divest ourselves of the encumbrance of metaphysical subtleties, and address ourselves to the observation and classification of phenomena, we shall then, and not until then, be prepared to comprehend what is meant by the conservation of force, or, as it may be otherwise expressed, the indefinite propagation of motion.

If motion be taken in connexion with the so-called imponderable agents or forces—heat, light, electricity, magnetism, chemical affinity—it will be found that, by taking any one as the initial agent, all the others may be produced.

1. Motion.—A hammer moves against a piece of lead; *heat* is given out, which ignites phosphorus; *light* is emitted; *affinity* is brought into action between the burning body and the oxygen of the surrounding air; but further, the same heat acts on the thermo-electric battery, and a current of *electricity* passes through the conducting wires, and produces *magnetic* phenomena in the thermo-electric multiplier.

2. Heat.—Heat expands a body, or causes *motion* among the particles. It acts on the thermo-electric pile, and the rest of the series follow as before.

3. Light.—Light causes chlorine and hydrogen to combine—*motion* and *chemical*

affinity. It acts on a daguerreotype plate, which may be so arranged that the chemical action at the surface will produce a current of galvanic electricity through attached wires; and if the terminals be connected with a delicate multiplier, deflection of the needle—that is, *motion*—will ensue.

4. ELECTRICITY.—Electricity produces *motion* in bodies, *heat* and *light* in the spark. It acts chemically in decomposing water and causing oxygen and hydrogen to combine. When a current is sent through a coil, it converts a piece of steel placed within into a *magnet.*

5. MAGNETISM.—Magnetism can be employed to produce currents of *electricity. Motion,* heat, &c., follow.

6. *Chemical action* in the cells of a battery produces *electric* currents, from which, as before, all the other forces may be derived.

There is, therefore, a *correlation of the physical forces.*

Now, it is evident that, in the case of striking a piece of lead with a hammer, motion is propagated in the expansion of surrounding objects by the heat evolved. We can assign no limit to its continuance. It may be said that the heat is ultimately dissipated and lost, which may serve very well for ordinary purposes; but we mean only that we cannot trace the effects beyond a certain point. Strictly speaking, a motion once commenced can never end.

There is, therefore, a *conservation* of force, or an indefinite propagation of motion. But how shall we speculate on the chronological order of these forces from the beginning, or trace any given effect back to its absolute first cause? Corn is ground by a mill worked by the force of a stream, which stream is simply water flowing back to the level from which it was raised by the heat of the sun. Many of the forces of nature may be traced to the same cause.

The law of intensity, as affected by distance, does not depend on the nature of the force. It is of no consequence, for instance, whether light is caused by the projection, in straight lines, of luminiferous particles, from the luminous body, towards all points of space, or by the alternate contractions and expansions of contiguous elastic sphericles in a *plenum,* or by undulations of an ether. If it act from a centre, its intensity at any given distance will be diminished in proportion to the increased area over which it is spread, and the most elementary geometry shows that to be as the squares of the distance. It is neither wonderful, therefore, nor doubtful, that at half the distance the force should be four times as great. That is a necessary consequence of its emanating from a centre, and this law of the inverse square of distance is in no way inconsistent with the doctrine of the conservation of force. But science has a difficult task to accomplish in tracing out and assigning the quantitative relations which subsist among these various classes of correlated phenomena. To determine, for instance, the quantity of heat evolved by the impact of given masses moving with given velocities, and the electrical, chemical, and other effects, which may be regarded as functions of that quantity. There is no way of accomplishing this task but by going back to the conditions under which mass, velocity, and force can be quantitatively estimated, and rising by means of a suitable analysis to cases which are more special and complex. Whether chemical phenomena will ever yield to such an analysis, it would be vain to conjecture; but of this we are sure, that by no other means can purely empirical generalisations be raised to the rank of *positive* laws.

A long and interesting discussion followed, in which several of the members present joined, and the thanks of the meeting were accorded to Mr. Hamilton for his valuable and interesting communication.

Mr. MERCER then made some observations on preserved meat juice and pepsine, preparations which have been lately brought into use, and specimens of which he placed on the table.

Mr. SAMUEL exhibited a specimen of crystallized bihydrated sulphuric acid.

Thursday, 9th April, 1857.

ROBERT CLAY, ESQ., IN THE CHAIR.

Mr. Martin, Brownlow Hill, was elected a Member of the Society.

The Secretary, Mr. MERCER, announced that the competition amongst the students of the laboratory class had taken place for the President's prize, and that

Dr. Edwards had awarded the prize to Mr. J. W. Taylor; and he also reported that all the competing Essays were superior to any he had before received.

Mr. H. Sugden Evans, F.C.S., then read a paper on

MICROSCOPICAL EXAMINATION OF CINCHONA BARKS, ILLUSTRATED BY THE AID OF THE OXYHYDROGEN LIGHT APPLIED TO AN ORDINARY MICROSCOPE,

of which the following is an abstract:—

Having on a former occasion intimated his intention of making a microscopical examination of Cinchona Barks, from which he anticipated a ready means of estimating their commercial value, the paper this evening was to lay before the Society the results of a preliminary examination.

Although from the repeated examination of a great number of specimens he had hitherto failed in discovering differences of structure, sufficiently distinct and decided, to be relied upon as positive indications of species or quality, there were, he said, certain broad and general distinctions of structure sufficient to indicate, to some extent, the character of the bark.

The more specific differences appeared to be obliterated during the growth of the elementary tissues, which, being subjected to such varying influences of climate, temperature, and situation, frequently become entirely changed in their characters, and this might often be seen in sections taken from different positions in the same bark.

These circumstances greatly complicated the study, adding to its interest as well as to the difficulty of reducing its results to general and practical utility. In demonstrating the differences which could readily be traced, Mr. Evans wished to impress on the Society the vast field which lay before them in utilizing the immense power of observation afforded by the microscope, and hoped to enlist some in the service. With a greater number of earnest, patient observers, he considered it would not be long before the microscope would be made to speak out with a clear and decided voice, not only with regard to the secrets of each kind of Cinchona bark, but of the quality and purity of nearly every substance the Pharmaceutist has professionally to deal with. Hitherto there has been a lack of earnestness in observers, and in this respect our continental and even transatlantic brethren have outshone us; but surely the British Pharmaceutist will not longer suffer it to be said he is one whit behind his neighbours.

Mr. Evans concluded by illustrating the structure of the principal varieties of Cinchona bark, by a novel and very successful application of the oxy-hydrogen light to an ordinary microscope, the magnified image of delicate sections of the barks being very clearly and brilliantly delineated upon a disc, the magnifying power employed being an ordinary achromatic objective of half-inch focus.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE MANUFACTURE OF THE CHINESE GREEN DYE, CALLED 緑膠 *LO-KAO.*

BY THE REV. M. HÉLOT,

Missionary of the Company of Jesus.

(*Continued from page* 520.)

Manufacture of the Lo-kao at Azé.—In the account which we have previously given of the dyeing of cotton cloth by the bark of the *Lo-za*, it will have been observed, that the cloth after each immersion in the dye, is placed to dry and exposed to the sun, *without having been rinsed in pure water.* Now it is from the *excess of dye* in this cloth that the substance *Lo-kao* is extracted.

The process is as follows: five or six vessels filled with clear cold water are prepared. Into the first vessel the dyed cotton cloth is immersed and shaken about (without precisely being washed); the water becomes slightly coloured green. The same process is repeated in the second vessel, in the third, in the fourth, and so on; the cloth being lastly dried, is ready for sale. The water from the several vessels is collected into a large boiler; on the surface is spread a somewhat thick layer of cotton threads, and the whole is then heated. Upon boiling, the colouring matter suspended in the water, but not dissolved, is entangled by the cotton threads, and subsides, while the water itself becomes transparent: this water is then poured off and the cotton threads subjected to the same operation a second time, and so on until they are sufficiently loaded with the green colour. In general, about six pounds of cotton thread are required for absorbing the excess of green colouring matter set free in the washing of 300 pieces of cloth, each thirty feet long by one foot broad.*

The cotton threads being properly charged with colour, are washed, being rubbed in the hands, six pounds requiring about 100 pounds of clear cold water. An impalpable green powder is separated and settles to the bottom of the vessel. The cotton threads are washed in this way in eight or ten waters, when they are put aside to be again charged. The green powder collected in the several vessels having been united and thoroughly washed by decantation, is rapidly dried in the following manner: a sheet of bibulous paper having been placed upon a layer of ashes, the colour in the condition of a thin paste is poured on to it, and carefully and gently spread out; the ashes absorb the moisture, and the sheet is soon ready to be removed and dried in the sun. The thin layer of colour cracks, and separates from the paper in the form of little flakes, which are disposed of in trade under the name of *Lo-kao*. The thinner the flake, the more it reflects,—still more so if it is dried on a polished surface; so in fact, this *reflet* must be cautiously accepted as an indication of the goodness of the dye. Forty pieces of cloth afford about one ounce of *Lo-kao*. One of the manufactories at Azé dyed during this year 8000 pieces, and sold upwards of 12 lbs. of *Lo-kao*. The five factories at Azé could hardly produce altogether more than 30 lbs. or 40 lbs. of the dye. The manufacturers of the dye sell it only in packets of ten ounces, the average price being weight for weight, about the same as silver, say eight or nine francs per ounce; but the demand which Europeans have of late made for it, has caused an advance, and when I was at Azé, the price had risen three dollars per 10 ozs., being, in fact, fifteen dollars instead of twelve.

I have made some minute inquiries as to adulteration, but all the workmen whom I have asked myself, and still better those whom I have caused to be interrogated by a skilful Chinese, have alleged that the thing could not be done, and that any foreign substance, even in small proportion, would vitiate the colour too much for it to pass undetected. The only addition that I can discover is ever made, are fine iron filings, which give weight without impairing colour: but they are easily perceived upon wetting a little of the dye and rubbing it on a glass with the finger-nail. The dye may lose, however, much of its beauty, if not carefully preserved from damp. For this reason it ought to be wrapped in a piece of skin and kept in a vessel containing fragments of quicklime, which of course must be renewed as they become hydrated. The readiness with which the *Lo-kao* changes by moisture, explains why it can only be prepared in winter, since in spring and summer the solutions would speedily become mouldy, and the colour would be lost.

The manufacture carried on at Azé is confined to the dyeing of cotton cloth with solutions of the bark of the *Lo-za*, and to the extraction of the green dye *Lo-kao*, the latter being all sold. I have been told, however, of three houses at Soo-chow who make use of *Lo-kao*, and have obtained the following particulars regarding its employment from a workman who has been engaged in dyeing with it.

To form the dyeing solution, the requisite quantity of *Lo-kao* is placed in a little cotton bag: the proportion of one ounce of the dye for every ten pieces of cloth (each 30 feet by one foot) dyes a strong colour; the same quantity used for 25 or 30 pieces of cloth imparts a lighter colour, such as that of the specimen I have sent. At all times, it is desirable to prepare no larger quantity than is likely to be used at once. The *Lo-kao*, being tied up in a little bag, is softened and reduced to a pulpy condition by being allowed to soak for twelve hours in water. Some more water is then added, and the bag is squeezed and rubbed in the hands until the *Lo-kao* is well diffused through the water. Carbonate of soda is then added, in the proportion of ten ounces to one of the dye: the liquor is then heated until perfect solution takes place. The quantity of water is arbitrary, depending on the intensity of tint required. The bath being in readiness and heated to from 50° to 60° [122° to 140° F.], the cloth to be dyed is immersed in it. Such cloth ought to be perfectly white and deprived of its stiffening by washing.

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* This *foot* is about equal to the *metrical foot* or 0.33 metre.

The liquor is wrung out by twisting, and the cloth, without being dried, is dipped a second time, and again wrung out: it is afterwards rinsed in clean water, and dried in the shade. Such cloth is known in Chinese commerce by the name *Ou-lo-sé*, *i.e.* water-lily green colour, or *Ou-lo-pou*, *i.e.* cloth of the colour of the leaf of the *nenuphar*. A piece of cloth 30 feet by 1 foot is reckoned to cost for dyeing 15 cents, which for a square *metre* would be a little over 5 cents.

The conclusions I have arrived at may be thus summed up:—

1. The shrub affording the dye *Lo-kao* is of two species, both growing wild—the one on the mountains in the S.W. of Tche-kiang, the other in the fertile plains of the same province.

2. It is by the maceration of the bark of these shrubs, assisted by the action of the sun, that the green colour is extracted. It is not prepared from the seed, which is however a little black berry like the *cassis*, which, crushed upon white paper, stains it green. No use is made of this berry at Azé.

3. Cloth coloured green by the liquor obtained direct from the bark of the *Lo-za*, ought to be regarded not as dyed with the *Lo-kao*, but rather as a residue obtained in the preparation of this substance. This will explain how the colour of this expensive dye is imparted to so cheap a material. Silk is said to be never dyed with *Lo-kao*.

4. The only mordants used are lime, which is added in the maceration of the bark, and carbonate of soda, which is employed to render the *Lo-kao* soluble.

A peasant of Shantung has, however, assured me that alum is used in that province.

5. The quality of the dye depends on the fineness of its paste. The best *Lo-kao* is that obtained in dyeing cloth successively with the *Hom-bi* and the *Pa-bi Lo-za*, such as in the process carried on at Azé. I have been assured that it is also prepared from the bark of the *Pabi-Loza* only, but at Azé they consider such product inferior.

6. To preserve the dye, it must be kept secure from humidity and consequent mouldiness.

[*Note by the Translator.*—In the above communication, the French system of representing the sound of Chinese words has been followed; and as this may occasion perplexity to some readers, I avail myself of the kind assistance of a Chinese scholar to add for comparison a list of the principal words as spelt according to Dr. Morrison's manner:—

Hélot.	*Morrison.*
Lo-kao	Lŭh-kaou.
Lo-za	Luh-tsai.
Pa-bi	Pih-pi.
Hom-bi	Hung-pi.
Lieu-lo-chou	Lew-luh-shoo.

Hélot.	*Morrison.*
Lieu-lo-tche	Lew-luh-che.
Se-lo-pou	Se-luh-poo.
Ou-lo-pou	Ho-luh-poo.
Ou-lo-sé	Ho-luh-tsai.
Azé	?

SIAM CARDAMOMS.

Among some recent imports from Bangkok, the capital of Siam, are 66 bags of Cardamoms, which have been offered for sale in London. The principal portion of these Cardamoms, namely 43 bags, are the fruits, not of *Elettaria Cardamomum* Maton, but of *Amomum Cardamomum* L., a drug once well known in Europe, but for many years past of very rare occurrence. This Cardamom, described by Pereira as the *Round* or *Cluster Cardamom*, and also known as *Amomum verum*, *Amome en grappe*, &c., possesses a very agreeable and powerful aromatic, camphoraceous odour and taste, closely analogous to those of the Malabar Cardamom (*Elettaria Cardamomum* Maton), which it would well replace in medicine.

The remaining bags consisted of the seeds of *Amomum xanthioides* Wallich, deprived for the most part of their capsules, of which, however, quite sufficient remained for the ready identification of the species. The seeds are mostly coherent in three-lobed masses; they are tolerably aromatic, with a somewhat peculiar flavour.

Amomum xanthioides was discovered in Tavoy by Gomez, Dr. Wallich's botanical collector, in the year 1827, but the specimens he obtained were without flowers, and therefore not complete enough for a full botanical description. The plant was, however, named and included in the catalogue of the Indian Herbarium presented by the Hon. East India Company to the Linnean Society of London. In the *Pharmaceutical Journal* for March, 1855, may be found a figure of one of Dr. Wallich's specimens, and also Dr. W.'s brief memoranda on the plant, taken from his own MSS.; this we believe to be the only description of *Amomum xanthioides* yet published.*

GENUINE BREAD WITHOUT ALUM.

In accordance with invitations from the proprietor of the Polytechnic Institution to a meeting of medical and other scientific men to witness the application of a new process for fermenting and making bread without the use of alum, &c., about twenty or thirty gentlemen assembled in the lecture-room at or near the hour appointed. There was an array of specimens of bread and of ingredients used or said to be used in its manufacture and adulteration. After waiting about half an hour for the company to assemble, Mr. Pepper delivered a lecture on the process of bread-making, in which he explained Mr. Stevens's new process of fermenting bread. He described the usual mode of making bread, as adopted by London bakers, which, he said, consisted in boiling some potatoes, mashing them into a softish paste with water, mixing this with yeast, allowing the mixture to ferment, then mixing it with a portion of the flour and fermenting it, to form what is called the "sponge," breaking the sponge by the addition of a considerable quantity of water, and adding the remainder of the flour, together with some common salt, and usually a little alum, to form the dough, which is divided into loaves and put into the oven.

In Mr. Stevens's process no potatoes are used. He employs the yeast obtained from pale ale breweries, and this yeast is washed with water to deprive it of bitter taste. The yeast is mixed with a little flour and water and left to ferment, arter which more flour is added to form the sponge, and the remainder of the process is the same as that above described, excepting that Mr. Stevens adds no alum, that he uses a smaller quantity of yeast than is usually employed, and that his bread is made into long rolls like the French bread, instead of cubical loaves such as English bakers usually make.

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* It has also appeared in the *Journal de Pharmacie* for 1855, and in *Bonplandia*, iii., p. 129, in both cases extracted from this Journal.

Mr. Stevens's process is essentially the same as that adopted by private families in making "home made bread." Mr. Stevens states that perfectly good and light bread may be obtained by his process, if the best wheaten flour be used, without the necessity of adding either potatoes or alum, but in consideration of the great purity of his bread, he charges a penny a loaf more than the usual baker's price. If there were no other question involved than the means of making good bread from the best wheaten flour, irrespective of price, Mr. Stevens's solution of the question might be admitted to be complete, and yet he could not correctly claim credit for the discovery of anything new. But the bakers' question involves the means of making bread of a good, and as far as possible, uniform description, from flour which is constantly varying in quality. The bakers are required to convert the corn of the country, such as is furnished by nature and husbandry, into the best bread it is capable of producing, and of supplying this bread to a dense and hungry population at the lowest price at which it can be made.

Experience has shown that, by the addition of a small quantity of alum a saleable and, to all appearance, a sound wholesome bread may be made with flour of inferior quality, such as would otherwise be scarcely fit for use in the form of bread. The use of alum being objected to, and in fact, contrary to law, the problem to be solved is, whether any less objectionable substance, or any variation in the process would answer the same purpose. Towards the solution of this question Mr. Stevens has done nothing, but his display at the Polytechnic Institution was rather a commercial exhibition than a scientific novelty. Samples of his bread have been extensively circulated among scientific and medical men, three twopenny (or threepenny?) loaves being sent in a basket with a note, requesting the favour of a trial and opinion, and a small pamphlet, entitled *A Digest on the Manufacture of Pure Bread.* Those gentlemen who have the courtesy to acknowledge this kind present, find their letters published as testimonials in favour of the bread.

DETECTION OF ALUM IN BREAD.

Two methods have been suggested for the detection of alum in bread:—

1. *The process of Robine and Parisot*, which consists in macerating the bread in cold water, filtering the liquid, evaporating to dryness, treating the residue with water, and testing the filtered solution for alumina and for sulphuric acid.

2. *The process of Kuhlmann*, which consists in incinerating the bread, treating the ash with nitric acid, evaporating to dryness, dissolving the residue in water, and testing the filtered solution for alumina.

The above represent, in their principal features, the two modes of proceeding, one or other of which is usually adopted by Chemists in this investigation.

In a paper recently read at a meeting of the Chemical Society, by Mr. E. H. Hadow, of King's College, London, the author gives the results of experiments which were made with the view of ascertaining which of the two processes above described was the best. Bread was made from pure flour, and a quantity of alum equal to that used by bakers was added to it. It was found that none of the alumina could be extracted by the process of Robine and Parisot, the water taking only the sulphate of potash and sulphuric acid of the alum. By Kuhlmann's process the alumina was readily obtained. The author, concluding from these results that the alumina had associated itself with some constituent of the bread, as it does under other circumstances when used as a mordant for fixing colours, thought its presence might possibly be detected by adding a colouring matter to the bread, and observing how far this was absorbed and retained. A weak decoction of logwood was prepared, into which two pieces of bread, one of which had been made with alum, and the other without it, were put. The alumed bread acquired a decided purple dye, which penetrated to some depth into the interior, while no such result occurred with the bread to which no alum had been added. The author thinks this method may be made available for ascertaining whether alum has been used in making bread.

The results obtained by Mr. Hadow, in reference to Robine and Parisot's process, are confirmatory of those previously arrived at by other Chemists, and the other experiments, described above, also tend to confirm the opinion which has been expressed in this Journal and elsewhere, that when alum is used, as bakers usually employ it in the manufacture of bread, it undergoes decomposition and ceases to exist as alum in the bread.

ALUM IN BREAD.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Dear Sir,—I notice in the periodicals a report of a recent meeting of the Chemical Society of London, at which Mr. E. A. Hadow read a paper upon the above subject.

He is stated to have taken exception to maceration processes, and to have recommended the incineration plan of Kuhlmann as perfectly satisfactory. Upon the first proposition I can fully endorse his opinion, and may add that some time since I put the question to the following proof:—Taking a sample of pure flour, I added to it alum in the ratio in which I found that substance in a sample upon which a miller had just been convicted, and I then saw the mixture made into bread. The maceration process extracted no alumina whatever from the bread, but by incineration the whole was recovered. Mr. Redwood has already pointed out that the effective portion of the base must lose its soluble form, and the difference between the physiological effects of bread containing insoluble or excess of soluble alumina respectively, is worthy of the attention of those to whose province it belongs.

If the plan of aqueous maceration has the disadvantage of not detecting alum when it has really been introduced, Kuhlmann's method is open to a more dangerous objection, inasmuch as it may appear to prove adulteration where none exists. As an absolute test, it is based on the assumption that alumina is not normally present in wheaten flour. This is an error, and the knowledge of its having in one case caused the accusation of innocent individuals has induced me to refer to the subject. Some months since, the Board of Guardians of a neighbouring town referred samples of the flour supplied to an Analytical Chemist. The incineration process was adopted, and two samples from highly respectable firms reported to contain alum. The matter became public, and further analyses were demanded. Having been entrusted professionally with one set of samples, which were officially verified, whilst the others were forwarded to Dr. Letheby, the result of our independent examinations coincided in reporting that no alum was present, but that a considerable amount of alumina was detected. Experiments upon various descriptions of foreign wheat had shown me that in the Egyptian variety, extensively used of late, a very large quantity of alumina is present after grinding, being greater or less according to the efficiency of the cleansing process to which the grain is subjected. The method of harvesting, the plant being pulled up by the roots and the grain trodden out by cattle, sufficiently accounts for the large quantity of soil intermixed, and this sometimes amounts to 25 per cent. of the total weight. As the grain is usually perforated by insects, the cavities resulting, and also the natural superficial depressions, are quite certain to retain a portion of aluminous earth, after the washing which it usually undergoes.

Without sufficient proof, the possibility of the plant assimilating a portion of alumina must be considered an open question.

Believe me, yours truly,

Leeds, April 17, 1857. RICHARD REYNOLDS.

ON THE USE OF ALUM IN MAKING BREAD.

THE Board of Works of the Holborn district have recently published in the daily papers a document signed by their Medical Officer of Health, Dr. Gibbon, in which the public are cautioned against the use of bread containing alum, the injurious effects of such an article of diet being described in terms calculated to cause much alarm. Dr. Gibbon says:

"On analyzing numerous samples of bread purchased of different bakers in the district, I have generally found them more or less adulterated with alum; in other respects the article has proved good and wholesome. Notwithstanding that the law (37th George III., cap. 98, sec. 21) prohibits under a penalty the use of alum in the manufacture of bread, it is admitted, even by bakers themselves, to be so used under the name of "stuff." I am satisfied that this sophistication has been practised with the most innocent intentions. The bakers believe the portion of alum mixed with the bread to be quite harmless; to a certain extent it is a commercial fraud, though it is a great convenience in the manufacture, and improves the quality of the bread in certain respects which the public appear to value. If it be perfectly harmless I conceive we have no right whatever to interfere in the matter. However, it is my deliberate opinion that, although alum is not a poison, yet that its use in the manufacture of bread is injurious to health, and concurs indirectly with other things in increasing the mortality, especially of young children, the staple article of whose dietary is bread.

The more effectually to discountenance this practice, I will briefly detail some of the grounds whereon this opinion is founded.

The well-known medicinal effect of alum is to confine the bowels. It is also well known that small doses of alum repeated for a considerable time will produce at first costiveness, afterwards great irregularity of the bowels—that is to say, alternations of costiveness and looseness, and at length continued looseness with ulceration. The quantity of alum which I have generally met with in bread has been in the proportion of from half a drachm to a drachm in the 4lb. loaf; so that the man who consumes half a loaf a day swallows every 24 hours from 15 to 30 grains of alum. Now it is found that even twelve grains per diem, taken by a healthy adult, will produce constipation. Its effects on children would, of course, be greater than on adults; a smaller quantity would suffice to produce the diarrhœa and dysenteric symptoms, and they would appear sooner. Alum enters into chemical combination with the gluten of the flour, therefore I admit that its effects in bread are less active and injurious than when administered in its pure state. I have little hesitation, however, in assigning this impurity in the bread as the chief cause of the frequent constipation, headaches, liver derangements, &c., of those who are dependent on bakers for their bread. The fatal diarrhœa of infants under three years of age may also have arisen from, or have been aggravated by, this cause.

As this adulteration has been practised for a very great length of time, I cannot recommend the adoption of any harsh measures for its suppression. I would suggest that all bakers in the district should be cautioned against it. If any flagrant case occurs where the injury to health is clearly made out, I shall feel it to be my duty to advise your board to take the necessary proceedings to prevent its recurrence.

When the bakers are duly informed of this opinion, I am in hopes that they will of their own accord cease to use alum in making bread. The bakers' plea at present is that it is harmless, that the "public like it," and "will have it." So that the more effectually to put down an adulteration which is injurious to health, the public on their part should cease to set so high a value on those qualities in a loaf which alum is used to produce.

The following particulars will, I trust, enable the purchaser to distinguish a loaf that does not contain alum from one which does :—

Alum increases the whiteness and firmness of the bread made from inferior flour, and thereby causes it to resemble bread made from the very best flour. The qualities which alum imparts to a loaf are very unimportant, having reference merely to the appearance, lightness, neatness of shape, &c.

The chemical action of alum on moistened flour is analogous to tanning, and destroys in a considerable degree its nutritiveness. It converts the gluten (the most nutritious portion) of the flour into a kind of tough, tenacious "wash-leather," which is difficult of digestion. This gives the dough a tenacity and firmness, enabling it to retain the thousand of little air bubbles (given off by the yeast) which constitutes the "lightness" or spongy porous character of the bread. Hence flour that will not "rise" may be made to do so by means of alum. Another object in the use of alum is, that it preserves the upright form of the loaves, and prevents them from adhering firmly together, thereby enabling the baker to separate them more readily on their removal from the oven—the "batch parts clean," as the expression is, without tearing. An unalumed loaf is, with a little practice, distinguishable from an alumed one by its appearance alone: it is wanting in all those peculiarities which I have mentioned as the effects of alum; it is not so bulky, nor so symmetrical in its shape; its sides are roughened and torn, in being separated from the batch. Unalumed bread "bites short," alumed bread "bites tough," and the rough, sour taste of alum is slightly perceptible in it. The most marked contrast, however, is apparent in "crumbling," when a day or two old. Unalumed bread crumbles with the greatest facility by rubbing it between the hands, whereas alumed bread, however old, "crumbles" with difficulty. In the same way alum renders the new loaf less liable to crumble when cut."

There is a strange mixture of truth and error in this document, to which it seems desirable to direct attention. We do not propose here to discuss the question, whether or not the use of alum in making bread is free from objection, but wish to point out some of the fallacies upon which the current opinion on the subject is founded. Dr. Gibbon having discovered, in the 2 lb. loaf of bakers' bread, a quantity of alumina and sulphuric acid equivalent to from 15 to 30 grains of alum, proceeds to point out what would be the effect of taking this quantity of alum daily, and concludes that alumed bread must be highly injurious to the health of those who eat it. By a parity of reasoning, it might be concluded that the common salt contained in the bread, and used with almost every article of diet, must be highly injurious, because the chlorine or sodium in a separate state would be so. Dr. Gibbon, indeed, seems to have been aware that his argument involved a fallacy, for he admits that the alum enters into chemical combination with the gluten of the flour, and therefore that its effects in bread are less active and injurious than when administered in a pure state. Had he carried his chemistry a little further, he would have found that the alumina, and not the alum, combined with the gluten; and then, if he could have shown that the 3 grains of alumina contained in 30 grains of alum (the maximum quantity in the maximum consumption of bread for a grown person) would cause injury to health, he might with better reason, but still without sufficient warrant, have inferred that alumed bread was injurious to health. But his chemistry having failed him, and his first argument having broken down, he resorts to a second,—the alum converts the gluten of the flour into a kind of tough, tenacious wash-leather, which is difficult of digestion. Here it may be asked, what evidence is there that alum makes the gluten difficult of digestion? The conclusion is arrived at, not as the result of observation, but of reasoning founded upon supposed analogy. Wash-leather is difficult of digestion; alumed gluten is a kind of wash-leather, therefore alumed gluten is difficult of digestion.

Such are the arguments adduced to show that the public health is injured by the use of alum in making bread. The subject has never been fully and fairly discussed on its true merits. Dr. Gibbon has, we believe, pretty correctly stated the advantages resulting from the use of a small quantity of alum, which, as he says, "improves the quality of the bread in certain respects, which the public appear to value." This is the result of observation and practical trial. The use of alum gives tenacity and firmness to the gluten, "enabling it to retain the thousand of little air bubbles which constitutes the lightness or spongy porous character of the bread," qualities which Dr. Gibbon tries to persuade us are very unimportant, but which the public nevertheless "appear to value." While these advantages are generally admitted, the objections which are urged against the use of alum are altogether problematical, and unsupported by any satisfactory evidence. Although the evidence we possess will not justify the assertion that the use of alum in making bread is wholly free from objection, yet there are sufficient grounds for concluding that the evils which have been assigned to that practice have been greatly exaggerated; and as certain advantages appear to result from it, the subject ought to be thoroughly investigated by a competent scientific commission, appointed by the Government.

ON SOME POINTS IN THE COMPOSITION OF WHEAT-GRAIN, ITS PRODUCTS IN THE MILL, AND BREAD.

BY J. B. LAWES, F.R.S., F.C.S., AND J. H. GILBERT, PH.D., F.C.S.[*]

THIS paper discussed an extensive series of experiments, in which wheat-grain and its products were traced from the field to the bakery, the results being given in numerous tables. The first of these gave a summary of the results of the growth of wheat for ten years consecutively on the same land, and illustrated the influence of variation of climatic circumstance, from year to year, in one and the same locality, upon the general character and composition of the crop. The conclusion the authors arrived at, was, that within the limits of their own locality and climate, the season yielding the admittedly best character of grain, also generally afforded a high per-centage of dry substance in the grain, and comparatively low per-centages both of mineral matter and of nitrogen in that dry substance. The straw showed variations in these same points of composition, generally somewhat in the same direction as the grain, but subject to a wider range of exceptions than the latter in this respect.

The influence of various conditions of *manuring* upon the character and composition of the crop was next considered. With this view, the results obtained upon individual plots during the same ten years were now given, instead of the average from many plots in each year, as when the effects of season alone were to be discussed. In the experiments illustrating the effects of manures, there was pretty generally a slight increase in the per-centage of nitrogen in the grain grown by an annual excess of ammoniacal salts, compared with that grown by its side on land which was continuously unmanured. In the average of the seasons, however, there was a somewhat lower per-centage of nitrogen in the grain, where there had been a liberal supply of the required mineral constituents also, than where the ammoniacal salts were used alone. The range of difference in the per-centage of nitrogen, in the produce in one and the same season, was, however, even with these extreme variations as to the available supplies within the soil, not nearly so great as it was in different seasons with one and the same condition of manuring.

Twenty-three analyses of wheat-grain *ashes* were next recorded; nine referring to grains grown by different manures in 1844; eight to similarly varying specimens, the produce of 1845; and six to as many of 1846. From these it did not appear that the per-centage of any particular constituent of the ash of the ripened grain, was directly affected by the liberal use of it in manure. At any rate, the differences, if any, due to this cause, were within the limits of the ordinary errors of analysis. Here again, however, the effects of varying season were more marked than those of various manuring. Thus it was shown in a summary table of the results of the ash analyses, that the difference in the per-centage amount of almost every constituent, was much the greatest among the several grain ashes of 1845, which was a very bad ripening season, and much the least among those of 1846, which was the best maturing season of the three included in this comparison. It would thus appear that, other things being equal, the more favourably and perfectly matured the grain, the more constant would be the composition of the ash, and the less any direct effect upon it, from the mineral supplies by manure. Taking together the mean of twenty-three analyses of the ashes of grains grown at Rothamsted, and that of twenty-six analyses of wheat-grain ashes published by Mr. Way, it appeared that this ash consisted essentially of phosphates of potash, magnesia, and lime. The phosphoric acid amounted to nearly 50 per cent., the potash to about 30, the magnesia to from 10 to 12, and the lime from 3½ to 4 per cent. in the crude ash. The remainder, excluding adventitious sand and charcoal, consisted of small but variable amounts of soluble silica, peroxide of iron, and soda or chloride of sodium, with, according to Mr. Way, occasional traces of sulphuric and carbonic acids also. Soda or chloride of sodium seemed to abound much more in the ash of the less favourably ripened specimens; and the results afforded no reason for supposing that soda could take the place of potash as a constituent of the ash of fully developed grain.

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[*] *Quarterly Journal of the Chemical Society*, April, 1857. Read January 19th, 1857.

In selected cases, quantities of experimentally grown grains, namely, seven lots from the produce of 1846, nineteen from that of 1847, and two from that of 1848, were carefully watched through the milling process. In some of the cases nine, and in others seven different products of the dressing apparatus, were separately taken. The proportion of each of the several products in the respective grains was ascertained and recorded; and the per-centages of dry substance and mineral matter were also in every case determined. The three first wires of the dressing machine gave on the average rather more than 70 per cent. of the grain as *fine* flour, but in practice about 10 per cent. more would be obtained from the next two products, yielding in all 80 per cent. or more of pretty good bread flour. The average amount of *dry substance* in the various mill products was about 85 per cent., the external or more branny portions containing rather more, and the finer flours rather less. The per-centage of mineral matter varied very much in the different products, it being scarcely three-fourths of one per cent. in the fine flours, and ten times as much, or more than seven per cent. in the coarsest bran. From the much larger proportion of flour than bran, however, it resulted that rather more than one-third of the total mineral matter of the grain would be accumulated in its currently edible portions.

In one series of these mill products, from the finest flour at the head of the machine down to the coarsest bran, the nitrogen was determined, and also some of the constituents of the respective ashes. It appeared that the per-centage of nitrogen was about once and a half as great in the bran as in the finer flours. And even including all the currently edible portions, still the excluded branny parts contained considerably higher per-centages of nitrogen. Turning to the ashes of the respective mill-products, there was a much larger proportion of matter insoluble in acid in those of the finer flours than in those of the coarser brans; of the *phosphoric acid*, on the other hand, there was considerably the higher per-centage in the ash of the brans. The magnesia also was the higher in the ash of the brans, and the potash and lime the higher in that of the flours. Looking to the *distribution* of the various constituents, according to the average proportion in the grain of each of the several mill-products, it appeared that about three-fourths of the total *nitrogen*, and about one-third or two-fifths of the total *mineral matter*, were accumulated in the usually edible flours; and of the total phosphoric acid there was only about one-third in the ashes of the latter. Notwithstanding the higher per-centage of nitrogen, and the large actual amounts of the mineral constituents of the grain contained in the branny portions, the authors were of opinion, that, besides the information at present at command as to the character and condition of the nitrogenous constituents of the bran, such were the effects of the branny particles themselves in increasing the peristaltic action, and thus clearing the alimentary canal more rapidly of its contents, that it was questionable whether frequently more nutriment would not be lost to the system by the admission into the food of the imperfectly divided branny particles, than would be gained by the introduction into the body coincidently with them of the larger amount of supposed nutritious matters. The action alluded to might indeed be conducive to health with those of a sluggish habit, or who were over-fed, but with those who were not so, the benefits derivable from an already perhaps scanty diet, would be still further reduced.

Experiments were also described in which several lots of the experimentally grown wheats were ground in a colonist's steel hand-mill. The results of the examination of the products thus obtained, were, in the main, consistent with those from the products of the ordinary mill. They showed, however, more strikingly, the effects of mechanical means in separating different chemical compounds within the limits of the floury parts of the grain.

Experiments were next adduced, in which the different edible products, from grains grown by different manures or in different seasons, were made into bread; the several products of the dressing machine being employed sometimes separately and sometimes collectively. The result obtained was, that comparing with each other the three separate products which together yielded a fine flour, that at the head of the machine, which was the least nitrogenous, yielded on the average the least weight of bread for a given amount of flour—that is to say, it retained the least amount of water. Again, when the three products were mixed together, the flours of the season of 1846, which were the less nitrogenous, gave the less weight of bread—that is, retained less water than those of 1847, which were rather the more nitrogenous. The effect of an increase of nitrogen in augmenting the weight of bread was, however, not observable when this increase was due to including more of the more branny portions of the grain. The average yield of bread in twenty-two experiments with the individual products was rather more than 135 for every 100 of flour, equal to about 63 per cent. of dry substance and 37 of water in the bread. The average of nineteen experiments with fine flour, composed of the products of the first three wires mixed together, gave a produce of about 137½ of bread for every 100 of flour, and about 61½ of dry substance and 38½ of water in the bread. Bakers' loaves were next examined. Of these, four obtained from different bakers in the country, gave an average of about 62 per cent. of dry substance and 38 of water in the bread; and three, procured in London, rather more than 64 of dry matter and rather less than 36 of water. The authors concluded that from 36 to 38 per cent. of water was perhaps the best average that could be assumed for bakers' bread within twelve hours of its being withdrawn from the oven. They showed, by reference to a table of the results of other experimenters, that this agreed pretty well with the determinations of some of the most recent and trustworthy. Others, however, gave the water in bread as much higher; and all seem to agree that it was generally higher in country bread than in that of towns and cities.

The point next illustrated was the general influence of locality and varying climatic circumstance upon the per-centage of *gluten* in wheaten flour. It appeared by the numerous results adduced that, other things being equal, there was a tendency to an increase in the per-centage of gluten proceeding from the north to the south—a point which was illustrated in specimens both from the European and American continents. A comparatively high ripening temperature was, indeed, among other circumstances, favourable to a high per-centage of gluten. There were, however, interesting exceptions to this generalization; at any rate, so far as the per-centage of the *nitrogen*, if not of the gluten itself, was concerned. Direct determinations of nitrogen, in numerous pairs of specimens contrasted as to locality, had however led to conclusions perfectly consistent in the main with those to which the quoted results as to gluten had conducted; whilst the results of others pointed in the same direction.

The foreign wheats containing a high per-centage of gluten, which were generally ripened under a high temperature, had the undoubted character of yielding a flour of great "*strength*," and retaining a considerable amount of water in the bread. Owing, however, to their frequent hardness, and the peculiarity of their structural character generally, which rendered them both refractory in the mill and less fitted to make an easily workable dough, and a bread of the desired colour, texture, and lightness, they were less valued to use *alone* for bread-making purposes than many grains of less *per-centage* of gluten—provided only that they were in an equal condition as to maturation or elaboration of their constituents. Some of the most approved foreign bread-flour grains in the market had, indeed, a comparatively low per-centage of nitrogen; but apparently a very high *condition* of both their nitrogenous and non-nitrogenous compounds, as well as a very favourable relation to each other of these two classes of constituents. Within the limits of our own island again, on the average of seasons, the better elaborated grain would probably be the less nitrogenous; though the nitrogenous matter it did contain would be in a high condition as to elaboration, and as to its mutual relations, structural and chemical, with the other constituents of the flour. Hence it came to pass that, as our home-grown flours go, those which were the best in the view of the baker would frequently be those having a comparatively low *per-centage* of nitrogenous compounds—a higher *condition* more than compensating for the higher per-centage of nitrogen, generally associated as it was in our climate with an inferior degree of development and maturation of the grain.

It was further maintained that the high per-centage of nitrogen or gluten in wheaten flour was no more an unconditional measure of value to the *consumer* than it was in the view of the baker.

In illustration of this latter point, a table was given, showing the relation of nitrogen to carbon in a number of current articles of food. It was submitted that the under-fed, or chiefly bread-fed working population would, as their means increased, generally first have recourse to the addition of bacon, or other highly fatty matters; which, though they might increase the actual amount of nitrogen consumed, would seldom increase, and frequently decrease, the *proportion* of the nitrogenous, or flesh-forming, to the more exclusively respiratory and fat-forming constituents. Indeed, so large was the amount of fat, and therefore of respirable hydrogen as well as respirable carbon, even in fresh meat itself, that by its use the proportion of the nitrogenous to the other constituents would be much less augmented than might be generally supposed. Further illustrating the point by reference to the average relation of nitrogen to carbon in numerous dietaries, in many of which meat was included, and therefore fat with its respirable hydrogen as well as respirable carbon, the authors concluded that, independently of cookery, that which was admitted to be a superior class of diet was distinguished much more by including a certain amount of the more peculiarly respiratory and fat-forming constituents, in the condition and state of concentration as in fatty matter itself, and of the nitrogenous ones in the high condition as in animal food, than by the higher proportion of the flesh-forming to the more exclusively respiratory and fat-forming constituents.

Finally, in an Appendix was given a tabular form, showing the relation of the yield, and composition of the bread, to that of the flour, according to the number of loaves obtained per sack (280 lbs.) of the latter. And, assuming it to be established that the loss of dry substance by fermentation was less than one, or perhaps less than half of one per cent. of that of the flour employed, it resulted that the gain in the weight of bread by the non-fermenting method, was simply a gain in the water retained. Unless, therefore, the unfermented bread were better adapted for digestion and assimilation, or it were sold at a correspondingly lower price, the consumer would be a considerable loser by the purchase of the unfermented loaf.

With a view to systematize and facilitate the further investigation of foreign wheats and their analogues, Mr. Lawes and Dr. Gilbert have suggested the following scheme for the collection of specimens of grain, &c., grown in different localities and climates.

Object.—To trace the influence of locality, and especially of varying climatic circumstances, upon the characteristic development, the structural and chemical composition (as shown by the microscope and chemical analysis), and also the coincident comparative practical qualities of *wheat-grain*, or the other cereals which (according to variation in locality and climatic circumstances), are grown in its stead, as staple food-produce.

With this view, specimens should be collected (each from three to four English pounds weight or more) of the well matured corn, as prepared for sale or use. For their safe preservation, they should, in hot climates, be well sun-dried, and in colder ones, dried artificially, at a temperature not exceeding 120° to 130° Fah. before being packed. Tin cases soldered down, or otherwise perfectly closed, would be the best means of preservation and transmission; or, in defect of these, small thick canvas bags; a number of these being afterwards packed into sound wooden chests or casks. Each specimen should be labelled to correspond with the number of a *Descriptive Form*, giving particulars of locality, climate, and other circumstances of growth, &c.

In the selection of specimens care should be taken to procure the characteristic cereal produce of each region, other descriptions as well as wheat; *wheat*, however, being taken as the typical produce or standard of comparison. And, the accompanying *Record* should state the reputed circumstances of soil, aspect, or climate, which are supposed to render the growth of one or another variety of the same kind of corn more appropriate than that of another, or of one or another crop more appropriate than that of wheat, wherever this latter (wheat) is to any material extent substituted by other corn, such as rye, oats, &c., in the colder, or Indian corn or rice in the hotter regions.

It would be very desirable, wherever practicable, to provide with each specimen, or series of specimens, a registry in detail, of the particulars enumerated below. In case of the collection of an extended series, a book should be arranged, of which each page should constitute a *Form of Record* divided into two columns. The one headed *Particulars required*, and the other *Particulars recorded*. In the former the list of the enumerated items should be printed, and opposite to each (in the second column) any available information respecting it should be entered.

1. Names of country and locality.
2. Latitude and longitude.
3. General range of altitude above the sea (aspect, level, &c.); also general character of the soil.
4. Average dates of sowing and ripening.
5. Average annual, monthly, or other periodic rain-fall.
6. Average annual, monthly, or other periodic maximum, minimum, mean, and range of temperature.
7. Average annual, monthly, or other periodic barometric pressure, and dew-point.
8. Average number of weeks of active above-ground growth before blooming.
9. Climatic characteristics of period of growth before blooming.
10. Average number of weeks from blooming to ripening.
11. Climatic characteristics of period from blooming to ripening.
12. Where actual registries of rain, temperature, pressure, &c., are not available, state *in general terms*, especially for the above defined periods of growth, the characters as to *moisture of soil*, *moisture of atmosphere*, and *temperature of atmosphere*, of the locality yielding the specimen.
13. Whether chiefly grown for export, continuously, without manure, or in rotation, with manure, and what manure.
14. Supposed average produce to a given area of land; adopting the English acre and pound, or French hectare and kilogramme.
15. Whether generally a large or a small proportion of stem or straw.
16. In general terms, the estimation of comparative quality, and adaptation for bread-making, or other purposes.
17. Whether the specimen is an indigenous or imported variety, and how its characters are supposed to be modified by the climate, &c., under which it is grown.

REPORT OF THE

RESULTS OF PHYSICAL AND CHEMICAL INVESTIGATION,

AND OF THE

APPLICATIONS OF PHYSICS AND CHEMISTRY IN THE ARTS.

BY B. H. PAUL, Ph.D.

(Continued from p. 478.)

Preparation of Ferrum Reductum.—Hr. Zängerle* recommends igniting a mixture of 5 parts protoxalate of iron with 6 parts anhydrous ferrocyanide of potassium and 1¾ parts anhydrous carbonate of potash. The ignition is maintained until the evolution of gas from the melted mass ceases. This, when cold, is thoroughly washed with pure water and the residue dried. The product appears as a dark grey powder, consisting of metallic iron, so finely divided that when touched with a lighted match the whole mass burns gradually.

Preparation of Dye Pigment from Quercitron Bark.—Quercitron bark contains a considerable amount of tannin, which in the dyeing enters into combination with the mordants, and thereby injures the brightness of the colours. When the bark is treated with sulphuric acid the tannin is separated, and the colours then obtained are much brighter and richer.

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* *Neues Repertorium für Pharmacie*, vi., 27.

M. Rigaud's[*] observation that quercitrin is converted by the action of sulphuric acid into quercitin was first practically applied by M. Leeshing,[†] who subjected quercitron bark to the action of sulphuric acid.

Hr. Schäffer[‡] recommends the following proportions:—

Quercitron bark	100 parts
Water	280 "
Sulphuric acid	26 "

The bark is to be boiled for two hours with the acid, then washed five or six times by decantation, and the residue pressed. This product, when dry, is equal to three times as much of the bark.

Hr. Schlumberger recommends:—

Quercitron bark	100 parts
Water	300 "
Sulphuric acid	15 "

He finds that the conversion of tannin into gallic acid requires a temperature of 212° F.; that neither lime nor potash is extracted from the bark by this treatment. When the product is mixed with cold water, and then with pernitrate of iron, the reaction of tannin is very slight, but an alcoholic decoction gives a precipitate with gelatine. He also finds that when quercitron bark, or the product obtained by the action of sulphuric acid upon the bark, is mixed with tannin, the colours obtained are somewhat darker, but more muddy; the addition of gelatine counteracts this effect completely. When gallic acid was added in the dyeing operation, the mordants were dissolved, as might have been expected, in accordance with the results obtained by Prof. Calvert.[§] This fact shows further that the gallic acid produced by the action of sulphuric acid upon the tannin of the quercitron bark is removed by the washing, for otherwise the dyeing capability would be reduced instead of increased by this treatment.

By the treatment of quercitron bark with sulphuric acid the colour substance must have undergone a change, because the colour is fixed by mordants only at a high temperature, and is almost insoluble. An aqueous decoction deposits on cooling a copious yellow sediment, which appears to be Rigaud's quercitin.

Logwood, Lima wood, sandal wood, turmeric, Cuba wood, sumach, yellow berries, woad, galls, and pomegranate shells were subjected to the action of sulphuric acid in a similar manner, then washed, pressed, and dried. Hr. Schlumberger found that logwood, Lima wood, and sandal wood were injured by this treatment, but that the result was very advantageous with the other dye stuffs. The most striking effect was produced with sumach, when the water was mixed with 40 or 50 per cent. sulphuric acid by volume. The product, which may be called sumacin, thus obtained, gives finer yellow, grey, and black than quercitron, and the dyeing capability is increased fourfold; when mixed with garancin the colour obtained has more body, and the violet is not injured so much as is the case in dyeing with an admixture of wood containing tannin. Woad likewise acquires a much greater dyeing capability by the action of sulphuric acid, and the colour it gives is purer, but it requires then a temperature of 158° F. for dyeing.

Yellow berries, Cuba wood, and turmeric, treated in the same manner, give very satisfactory results in dyeing. For these substances, the liquid should contain from 15 to 20 per cent. concentrated sulphuric acid. The tannic acid of nutgalls and of pomegranate shells is not all converted into gallic acid by the action of sulphuric acid, but more colour substance is set at liberty. The colours produced with aluminous mordants are more decidedly yellow, and those produced with iron mordants are clearer. A stronger acid should be used for nutgalls than for pomegranate shells.

Chemical Relations of the Halogens.—The opinion that the chemical affinity of chlorine, bromine, iodine, and cyanogen varied constantly in degree, was shown to be incorrect under certain circumstances by Fehling, who found that in the fractional precipitation, by means of silver solution, of a liquid containing chlorine and bromine, the whole of the bromine is contained in the first portions of the precipitate.

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[*] *Ann. der Chem. u. Pharm.*, xc., 283.

[†] *Polytech. Journ.*, cxxxix., 131.

[‡] *Bulletin de la Soc. Indus. de Mulhouse*, 1856, No. 136.

[§] *Polytech. Journ.*, cxxxvi., 221.

M. Deville[*] has more recently brought forward a number of facts, which show that there are exceptions to this rule in the case of chlorine and iodine, as well as in the case of chlorine and fluorine. When silver is brought in contact with a mixture of hydrochloric and hydriodic acids, only iodide of silver is produced. Concentrated hydriodic acid acts violently upon chloride of silver, with evolution of heat; iodide of silver is produced, and hydrochloric acid gas evolved. An aqueous solution of iodide of potassium, digested with metallic silver, becomes alkaline, and iodide of silver is produced. Iodide of potassium is sensibly decomposed by fusion with silver.

Fluor spar is decomposed by gaseous hydrochloric acid at a high temperature. A mixture of fluor spar and alumina yields, by the action of hydrochloric acid gas, at the melting point of cast iron, chloride of calcium and fluoride of aluminum. Terfluoride of chromium may be obtained in a similar manner. Therefore hydrochloric acid gas decomposed fluorides of the alkaline metals, but not those whose formula is $R_2 Fl_3$.

Preparation of Caustic with Gutta Percha.—M. Robiquet[†] states that at the request of Dr. Maunoury, he has prepared caustic masses, by mixing together equal parts of gutta percha and melted hydrate of potash or chloride of zinc. These masses may be moulded into any required shape, so as to be applied to wounds, fistulas, &c.

Consumption of Soap.—Mr. Campbell states,[‡] that in 1851 the average consumption of soap in Great Britain was 7 lb. for each person annually. This is a much smaller proportion than is consumed in some places; thus, for instance, in Jersey, the consumption is found to be at the rate of 13 lb. per head; in the Isle of Man, where the population is less wealthy than in Jersey, the individual consumption is 8¾ lb. In Jamaica it is 5 lb. The allowance to inmates of workhouses and prisons in this country is about 10 lb. per head yearly; and assuming this to be no more than necessary, it has been found that, after deducting from the quantity made, the quantity exported, and also the quantity consumed by manufacturers of woollen fabrics, &c., there remained only sufficient to supply 15,790,000 persons at this rate, and it may therefore be concluded that 5,000,000 persons in Great Britain were not in the habit of using this important necessary at all, or else that a larger number did so very sparingly. However, taking 7 lb. as the average consumption, this would give for London a total of 8705 tons annually. The corresponding quantity of soda would be 609 tons, and that of fat 5484 tons.

Preparation of Molybdic Acid from Molybdinum Glance.—Professor Wöhler[§] states that the best way of preparing molybdic acid, is to heat lumps of the native sulphide of molybdinum in a glass tube, through which a current of air is passed. The molybdic acid sublimes quite pure.

Nuisances arising from Tallow and Soap-Works.—The question whether it is practicable to prevent the obnoxious smell produced in the melting of tallow and in soap-boiling, has recently been examined specially by Hrn. Grodhaus and Fink,[‖] in consequence of complaints that have been urged against the proprietors of candle and soap-works in Hesse Darmstadt. Professor Stein, of Dresden, has made experiments on this subject,[¶] and recommended the tallow to be covered with a layer of charcoal while melting. This plan was tried, but without satisfactory results. Hrn. Grodhaus and Fink recommend passing the vapour into the furnace a few inches above the bars, so that it may be burnt and carried away by the draught of the chimney; or passing it else into the chimney itself. For this purpose the melting vessel is to be covered with a closely fitting wooden lid, furnished with a tube, passing either into the furnace or the chimney. By this means it was found that with arrangements of apparatus, otherwise similar to what are generally employed in candle and soap-works, the offensive smell could be prevented, whether the fat was melted dry over the open fire, or by the aid of high pressure steam. An attempt was made to pass the vapour, when melting by steam, through the fire; but it was found to put out the fire, although this was not the case when the vapour was passed into the furnace over the burning fuel.

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[*] *Comptes Rendus*, xliii., 970.

[†] *Journal de Pharmacie.*

[‡] *Engineer*, iii., 301.

[§] *Ann. d. Chem. u. Pharm.*, c., 376.

[‖] *Gewerbeblatt für das Grossherz.* Hessen, 1856. 337.

[¶] *Polytechn. Journ.*, cxxxvi., 225.

Black Ink.—Hr. Reinige[*] mixes four ounces of concentrated decoction of logwood with 48 grains sulphate of iron; then adds successively 160 grains of crystallized carbonate of soda, 60 grains oxalic acid, and when the liquid has settled, 80 or 120 grains of gum.

Root of Chærophyllum Bulbosum.—M. Payen[†] has analyzed the root of this plant, cultivated by M. Jacques, head gardener at Neuilly. It contains:—

		Potato.
Water	63.618	74.00
Starch and similar substances	28.634	21.20
Cane sugar	1.200	—
Albumen and other nitrogenous substances	2.600	1.50
Fat	0.348	0.10
Ash	1.500	1.56
Cellulose (and pectose?)	1.478	1.64
Pectin	0.622	
	100.000	100.00

The starch granules of this root are globular; they are about one-third the size of wheat starch granules, and one-ninth the size of potato starch granules. Many of the granules present a flattened appearance at some part. The root of this plant seems to have acquired some importance in France as an article of food.

Preparation of Pyrogallic Acid.—Professor Liebig[‡] recommends distilling well-dried gallic acid mixed with twice its weight of powdered pumice-stone in a sand-bath, and passing through the retort a current of carbonic acid gas, so as to sweep away the vapour of pyrogallic acid as soon as it is produced, and thus to prevent its further decomposition, which takes place at a temperature very little above that at which it is produced. By this mode of operating Prof. Liebig obtained from 31 to 32 per cent. crystallized acid, and remarks that the full amount of 39 per cent. might perhaps be obtained by a judicious arrangement of apparatus.

On the Relations of Gold and other Metals to Light.—In the hope that the undulatory theory of light, when more fully and perfectly developed, may aid in comparing local actions with those which take place at a distance, and even help towards the comprehension of the physical means by which the latter are carried on, Prof. Faraday[§] has endeavoured, experimentally, to subject a ray of light to the action of particles, so small in size as to have an immediate and near relation, not only to the undulations of light, but even to the far smaller motions of the parts of the ether, which are supposed to produce, by their joint and successive action, the light-wave. His hope was, that by choosing particles of a fitting substance, experimental results might be obtained which, in the hands of the mathematical philosopher, might aid in perfecting the theory; and for this purpose gold was selected, because of its high optical qualities, shown in its comparative opacity, whilst possessing a real transparency; its high yellow reflexion and its true green transmission; its known action on light in very minute quantity; its capability of extreme division; its great gravitating force, which could be called upon for aid when the metal was in a state of extreme division; its elementary character; the integrity of its metallic state; the facilities of testing its presence and condition; and, finally, because known phenomena seemed already to indicate differences of action on light consequent upon its division.

The first state of division or attenuation considered, was that conferred on gold by beating into *leaves*. These, with their dimensions and general characters, are well known. Being taken up on glass damped by breathing or moistening, and then water introduced between the glass and the gold as a cushion, the gold can be perfectly stretched, so that when dry it is fit for optical examination; or if a diluted solution of cyanide of potassium be in like manner introduced beneath the gold, it can be more or less attenuated by solution, and then washed and dried. If gold-leaf thus extended and attached, either to glass, or plates of rock-crystal, or mica, be heated, it gradually loses its reflective power and its green colour, and becomes translucent. This change takes place far below the fusing-point of gold, and at a temperature as low as the boiling-point of oil if continued for several hours. When the heat is considerable, the gold-leaf suffers retraction of its parts, and becomes perforated by many fine holes, often symmetric in their form and dimension; but when the heat applied is the lowest competent to produce the change, it does not seem certain that the effect is due to such retraction; a good microscopic examination of this point is required. When pressure is applied to such decoloured gold by a convex piece of rock-crystal of short radius (as half an inch or less), the green colour of the transmitted ray reappears. This production of the green colour by pressure can often be referred to in different states of gold, as a proof, amongst others, that the metal is in the metallic condition. Silver-leaf undergoes a like change by heat, at even a lower temperature.

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[*] *Archiv. der Pharmacie*, cxxxv., 861.
[†] *Comptes Rendus*, xliii., 769.
[‡] *Ann. der Chem. und Pharm.*, ci., 47.
[§] *Proceedings of the Royal Society.*

Division by the Leyden Deflagration.—When a gold wire is deflagrated near the surface of glass plates by a strong electric discharge, it is dissipated in minute particles, which are deposited on the glass. These are seen by the microscope to be of different sizes; but by far the greater part are so minute as not to be distinguishable separately. The general film is of different colours by transmitted light, being grey, violet, or green; and often on the central or nearest part of the discharge, where the heat has been active, is of a fine ruby colour. All these particles act with acids and chemical reagents as gold acts; and there is no reason to believe they are anything other than metallic gold. They appear with precisely the same colours and characters, whether the deflagrations are made in common air, in oxygen, or in hydrogen; and whether the deposits are formed on glass, rock-crystal, topaz, or mica. When heated by any ordinary means, the green and grey parts change to a ruby or ruby-amethystine colour, and that whether surrounded by air or vapour of alcohol or ether. Even after heating, they adhere only as a dust to the plates, except when the temperature applied to those on glass has been very high. Agate pressure confers the green character on the heated deposits, and also, in frequent cases, upon that which has not been heated. All things considered, there can be no reason to doubt that the deposits thus made to vary in the colour of the transmitted light, consist of pure metallic gold.

Thin Films of Gold.—If a very weak solution of chloride of gold, free from excess of acid, and containing about 1½ grain of metal to two or three pints of water, be placed in a very clean glass or glazed vessel, in a quiet place, and then two or three small particles of phosphorus be laid floating on the surface, and the whole covered over and left for twelve or more hours, the gold will be reduced, covering the whole of the surface with a film, thicker near the phosphorus than at other parts. This film may be raised from the fluid by plates of glass, and washed and dried on the plates, and is then ready for examination. The thinner parts of such a film are scarcely visible, either by reflected or transmitted light; the transition to thicker parts is gradual, the thickest being opaque, and their reflexion that of dense gold. The colour by transmitted light varies, being grey, green, or dull violet. The films are porous, and act as pure gold, resisting all the agents which metallic gold resists. When heated, the transmitted colour changes towards amethyst and ruby; and then the effect of pressure in producing a green colour is in many cases very remarkable,—even a touch with a card or the finger being able to cause the change.

Gold Fluids.—Whilst the particles of phosphorus are producing a film on the surface, it frequently happens that streams of a red colour descend from them through the fluid; and if the phosphorus be submerged, and left for twenty-four or forty-eight hours, this red product is easily and abundantly obtained. If the gold solution be placed in a very clean bottle, and then a few drops of a solution of phosphorus in ether be added, and the whole agitated from time to time, the ruby fluid is obtained in a shorter period. This fluid is apt to change in colour, becoming amethystine, violet, purple, and finally blue; impurities of certain kinds in very small quantities cause this change. It is hardly possible to clean a vessel so well that the first portion put into it does not alter. Most saline bodies produce the change; a trace of common salt readily makes it manifest. That all these fluids are coloured by diffused particles, is shown by the circumstance, that on being left for a shorter or longer time, the particles sink, forming a coloured stratum of deposit; many months, however, are required for even the partial separation of the finer ruby particles. When a light is looked at through the fluid, the latter appears transparent; but when the eye is on the illuminated side, then the fluid is seen opalescent. If a cone of sun-rays be thrown by a lens into the fluid, the illumination of the particles within the cone shows their presence as undissolved bodies. It is believed that all the particles being metallic gold, the ruby are in the finest state of division, the blue in a more aggregated condition. Though the ruby particles, whilst freely diffused, are easily changed in colour, and as it is supposed by aggregation, still they may in some degree be separated by a filter; for on passing the fluid several times through a paper filter, the latter associates much of the rubifying substance with itself, and becomes of a rose colour; it may then be well washed and dried, and contains the ruby particles located, as it is believed, and prevented by their attachment to the paper-fibres from undergoing mutual aggregation. In this state their character is not altered from ruby to blue by salt or acids; they resist those chemical agents which are resisted by gold, but are dissolved by chlorine, cyanides, and the other substances capable of acting on gold. Heated either in oxygen, hydrogen, or air, no change of tint or quality is induced at such temperatures as the paper can bear; or, as far as can be judged, at any higher temperature.

A ruby glass, coloured by gold, is well known. This is considered by the author as analogous to the ruby fluid just spoken of, being a diffusion of gold particles through vitreous matter. The ruby fluid, by association with jelly, is rendered much more permanent than before; and then it may by a little warmth be had in the fluid state, or by cooling as a tremulous jelly, or by desiccation as a hard ruby solid, presenting all the transitions between the gold fluid and the ruby glass. By soaking the dried jelly and then warming it with water, these transitions may be passed through in the reverse direction, and so on, any number of times.

The relations of gold (and other metals) to polarized light, are of the following nature:—A leaf of gold inclined at a certain angle across a ray of polarized light (the inclination not being in the plane of polarization, or at right angles to it) affects it as a thin plate of any uncrystallized transparent substance would do, *i. e.*, the light appears in the analyzer, and the plane of polarization is rotated; or if a leaf of gold be held in an inclined position across a ray of unpolarized light, the beam is polarized as it would have been in passing through a like inclined plate of uncrystallized transparent matter. The gold greened by heating or pressure, when thus examined, does not appear to have acquired any particular tension or structure. Sulphide of carbon and crown-glass are optically so near each other, that a plate of the latter immersed in the former is neutralized; and though placed in an inclined position to a ray of light, either polarized or not, does not then affect it; but gold (and all metals) is still far above either of these. Hence the gold films obtained by phosphorus, when attached to glass, could be examined, and were found to have the optical properties of leaf-gold; the effect having no reference to the *thickness* of the film, but being most perfect in the thinner films, because they were in a more regular and perfect condition. It should be remembered that these films are not continuous layers like coats of varnish or fluid, but easily pervious to vapours. In like manner the deposits of gold (and other metals) obtained by electric deflagrations, were examined, and found to have the same marked qualities in a high degree; places where the film was scarcely visible on the glass, instantly showing the presence of the gold by their action on the polarized ray. In the same manner the very thin and almost invisible films, deposited occasionally on the sides of the vessels containing the gold fluids, showed themselves as gold. The thinnest layer of the fluid itself, however rich in particles, held between two plates of glass, acted no otherwise than a layer of water. It appears by the deflagrations that the particles of gold must be deposited in a plane, and then, though discontinuous, they act in the manner of continuous films of ordinary uncrystallized transparent bodies.

As to the quantity of gold in the different films or solutions, it can at present only be said that it is very small. Suppose that a leaf of gold, which weighs 0.2 of a grain, and will cover a base of nearly ten square inches, were diffused through a column having that base, and 2.7 inches in height, it would give a ruby fluid equal in depth of tint to a good red rose; the volume of the gold present being about the $\frac{1}{500000}$th part of the volume of the fluid; another result gave 0.01 of a grain of gold in a cubic inch of fluid. These fine diffused particles have not as yet been distinguished by any microscopic power applied to them.

EXTRACTS FROM AUSTRIAN PHARMACY.

BY MR. INCE,
Associate of King's College, London.

Pharmacy perhaps is the last thing we should expect in Austria, the home of Music, Art, and the accomplishments of polite society—a land which boasts of Vienna, the most elegant and fascinating capital of Europe, and glories in a cathedral, one of the wonders of the world, at Milan. From such a source we should least hope for grave instruction, or seek to glean materials for prosaic study. Gaiety and Science are not often friends. But, as the wisdom of a nation is said to be wrapped up in its proverbs, the French axiom may be quoted, which declares, *il ne faut jamais jurer de rien*, and the following remarks will show, that even Austria can furnish information to the English Chemist, and contribute something to the Literature of Medicine.

A review of the *Pharmacopœa Austriaca* (editio quinta) has appeared already in the Journal (vol. xv., page 92), besides which a paper bearing on Austria, entitled "Pharmacy in Italy," will be found in October, 1856. The field is not yet exhausted, and I shall endeavour to explore a few remaining points of interest.

The date of the Austrian Pharmacopœia is 1855: it is published by authority at Vienna. Being so recently brought out, no one will be surprised that such modern articles as Collodion, Gutta Percha, Kousso, Mannite, Piperine, Salicine and Santonine are included amongst its preparations: whilst Silver Leaf, Yellow and Red Lipsalve are not thought beneath its notice. All foreign Pharmacopœias have such a strong resemblance to each other, that the present one need not be specially described—a few popular phrases claim an explanation.

1. Acidum Borussicum is Hydrocyanic Acid.
2. Æther Vegetabilis is Acetic Ether.
3. Gas Hydrothionic is Sulphuretted Hydrogen Gas.
4. Sal sedativus Hombergi is Boracic Acid.
5. Spiritus Salis *acidus* is Dilute Hydrochloric Acid.
6. Spiritus Salis *fumans* is Hydrochloric Acid.

Excipulum, is a receiver; fatiscere, to fall to pieces; gibba, a raised notch (thus in the description of the Juniper, "galbuli apice gibbis tribus notati," marked at the apex with three tufts); and sartago, is an evaporating pan.

The entire arrangement of the Pharmacopœia is alphabetical, no distinction being drawn between Chemistry and Materia Medica. Among the list of Herbs, several occur which the London Chemist is often called on to supply, without knowing the source from which the application is derived; such are Herba Calendulæ, Herba Galeopsidis grandifloræ, Herba Saponariæ, Herba Spilanthi, and Herba Tanaceti florida. The Austrian Elæosacchara are stronger than those ordered in French formulæ, being in many (but not in all) cases made with three drops of an Essential Oil to one drachm of Sugar.

The extract of Ignatia Amara, well known this side the water by advertisement, is officially enrolled, and an authorized position is awarded to the Unguentum Juniperi, which lately has been strongly recommended for external use. Scarcely any foreign recipe is met with more frequently than—

I.

INFUSUM LAXATIVUM, OR AQUA LAXATIVA VIENNENSIS.

℞ Foliorum Sennæ Alexand. ʒvj.
Aquæ fontanæ fervidæ ℥vj.
Infuse a quarter of an hour, and add
Mannæ Electæ ℥j. Strain.

Many have been the methods suggested for the Distillation of Rose-Water. Some make it directly from the picked Rose petals, others distil the petals with a certain quantity of Otto, others again use Otto only; and it has even been proposed to mix the Otto with powdered sawdust, and pass steam through the compound: in addition to these various practices some experienced Chemists are in favour of using pickled Roses; for this purpose Piesse states the best proportion to be 1 lb. of common salt to 6 lbs. of Roses, and Mr. Haselden, 3 lbs. of salt to one of flowers.

These able Pharmaceutists may not be aware that they are marching under Austrian colours:—

II.

AQUA ROSARUM.

℞ Florum Rosarum, *sale* conditorum, ℔j.
Aquæ Communis ℔viij.
Abstrahe ℔iij.

It is always useful to see how common things are made by others, for instance—

III.

NITRATED OINTMENT.

℞ Hydrarg. ℥j.
Acid. Nitric. dil. ℥ij.
Solve caloris ope, et adde
Axungiæ (colatæ
et semi-refrigeratæ) ℥xij.
Mix with constant stirring.

Two formulæ must be mentioned in order to distinguish them from preparations of the same name, which occur in French and German Pharmacy:—

IV.

LIQUOR ACIDUS HALLERI, OR HALLER'S ACID ELIXIR.

℞ Spirit. Vini rectificat.
Acid. Sulph. concent. pur.
āā partes æquales.

In Germany, three parts of Rectified Spirit are added to one of Concentrated Acid.

V.

PULVIS AËROPHORUS.

℞ Sodæ Bicarb. pulv. ʒj.
Put in a blue wrapper.
℞ Acid. Tartaric. gr. xv.
Put in a white wrapper.

This corresponds to what *we* should call a "Soda Powder." The formula for the ordinary Pulvis Aërophorus has been given, vol. xiii. page 468 of the Journal.

How often does the Druggist receive an order for the following—

VI.

SPECIES ALTHÆÆ.

℞ Herbæ Althææ ℔ij.
Rad. Althææ ℔j.
" Liquiritiæ ℔ss.
Florum Malvæ ℥ij.
Chop and mix.

Marshmallow Lozenges are thus directed to be made:—

VII.

TABULÆ DE ALTHÆÂ.

℞ Pulv. Rad. Althææ ℥iss.
" Rad. Iridis ʒij.
Sacchari Albi ℥xij.
Mucilag. Tragacanthæ q.s.

Our Trade "Pastilles de Guimauve" are said to contain Marshmallow only as a microscopic object. In the list of reagents, the strength of Solutions is often indicated, as in the subjoined example:—

VIII.

ACIDUM OXALICUM SOLUTUM.

℞ Acid. Oxalic. ℥ss.
Aquæ Destillatæ ℥iv. Dissolve.

Solution of Chloride of Barium, and Solution of Muriate of Ammonia, are both of the above strength.

Lastly, the Austrian Pharmacopœia contains one English word, Arrowroot, and one French designation, Crême céleste, which latter is Cold Cream

IX.

UNGUENTUM EMOLLIENS, OR CRÊME CÉLESTE.

℞ Ceræ Albæ ʒiss.
Cetacei ʒiij.
Ol. Amygdal. ℥iss.
Melt, and add Aquæ Rosarum ℥j.

Austrian Pharmacy stands connected in the popular mind with two empirical remedies: the first is the "Austrian Specific for Cholera." Many will recollect the marvels related of it in the daily papers, as well as the praises lavished on it by English and Foreign officers; and were we to believe one half we see in print, all fear of the Asiatic scourge would vanish. This is the recipe:—

X.

"AUSTRIAN SPECIFIC FOR CHOLERA."

℞ Acid. Sulphuric. gtt. 96.
Acid. Nitric. gtt. 64.
Mucilage ʒiij.
Aquæ Destillatæ *ad* ℥viij. M
(The original formula was expressed in Decimals.)

The second is the nostrum called Warburg's Tincture, the notoriety of which was revived in one of the longest advertisements of the *Times* paper. On examination it is supposed to be Compound Solution of Quinine (gr. vj. in ʒv.), Aloes being an ingredient; if so, the statement by Dr. Livingston, that Quinine is most effective when given in combination with an aperient, receives a curious confirmation.

Another and stranger topic has to be discussed; for a writer would be indeed wanting in his duty who should fail to portray the actual position of the Austrian Pharmaceutist, and here I cannot do better than commence with a quotation from the sketch already mentioned, "Pharmacy in Italy:"—

> "Making allowance for the national temperament, which tends rather towards music than physic, the circumstances under which the Pharmacien is placed, are calculated to depress and paralyze, more than to develop his energy and talents."

This alludes partly to political restrictions, but principally to the existence of an all-regulating Tariff, by which the Austrian Chemist is bound hand and foot, and which determines the value of every article he has, from Sarsaparilla down to a one ounce bottle. Into such exact details does the Tariff enter, that it fixes the price of a Decoction, distinguishing between one that requires a quarter, half an hour, or an hour in boiling. The preparation of a cold or hot Infusion—straining and filtration—making an emulsion—the mixing and weighing powders—rolling out pills—covering them with flour—tying, sealing, corking, wrapping and directing medicine, have each a separate price assigned them, which must be scrupulously observed.

The effect of this limitation process is a theme open to discussion. There are some who are enthusiastic about uniformity, and would carry it, at all hazards, into a Chemist's business; others would prefer breaking stones. When "uniformity" may be paraphrased by the word *dead level*, theory should give place to stern reality. Two corpses are uniform in one respect, they are both alike defunct. If every man had equal skill, as well as the same facilities as his neighbour, and if the commercial value of drugs remained at a constant mark, a feeble argument might then be raised in favour of a private Tariff. As it is in Austria, the public (for whose protection laws are supposed to exist) are served by a man who has neither interest in, nor control over, his own affairs; and the State, by denying personal independence, effectually destroys that spirit of enterprise which alone paves the way either for improvement or discovery.

The further position of the Austrian Chemist may be gathered by consulting the Official Document appended to the Tariff, which is here translated from the Italian. It is published at Milan, date 1855:—

REGULATION OF THE MINISTER OF THE INTERIOR.

Dec. 22, 1854, compulsory throughout all the Provinces of the Empire, relative to the new Austrian Tariff of Medicines.

The Minister of the Interior issues the following orders relating to the new Austrian Tariff of Medicines here subjoined:—

I.

All Pharmaceutists without exception, as well as Doctors, and Surgeons authorized to keep an Apothecary's shop (the so-called "Pharmaceutical Chest"), must, on and after the 1st February, 1855, observe this new Tariff of Medicines.

II.

Those articles which are marked with a cross in this Tariff, or in the new Pharmacopœia authorized by the Decree Oct. 20, 1854 (No 275 in the Bulletin of the Laws of the Empire), may only be dispensed by Apothecaries to a regular prescription from an authorized Doctor, Surgeon, or Veterinary Surgeon. The other articles not specially marked may be sold without restriction.

III.

The several prices in the new Tariff of Medicines will be fixed according to the medical materials they contain, regard being paid to their quality, genuineness, purity, and manner of preparation, according to the prescriptions of the new Pharmacopœia. Medicines must always be dispensed exactly according to the directions of the Pharmacopœia, and those of the medical prescription. Whoever transgresses this rule, will incur a fine of from 50 to 100 florins in each instance.

IV.

The Tariff price of leeches will be determined from time to time for each Province by the respective Lieutenancy or provincial Tribunal, as has been hitherto customary. Those who dispense medicines for public funds will not be allowed any discount on leeches, on their presenting their accounts for reimbursement, as they (leeches) are not to be considered as medicines. All Apothecaries are obliged to be provided with leeches, and all Surgeons are authorized to have them.

V.

The Articles that the new Pharmacopœia directs to be prepared *extempore*, and which are not contained in the new Tariff, will be charged at the same rate as other forms of prescription, whenever the Medical prescription does not point out more precisely the manner of preparation, attention being paid to the formula of the Pharmacopœia with respect to the prescribed quantity of the contents, and to the different materials in their composition, in accordance with the prices fixed by the Tariff, and by the Charge for compounding Recipes.

VI.

In no case, and under no circumstances whatever, is it allowable to dispense medicines prepared from a recipe, having upon it *secundum meam presciptionem*, or any similar observation. Each instance of this kind, as well as the sending any recipe issued by an unauthorized person, will be punished by a fine of 5 florins.

VII.

On each prescription according to which medicines are prepared and dispensed, in any public or private Apothecary's shop, there must be clearly written, in figures, the several prices to be paid according to the Tariff, for the ingredients, for the work and for the containing vessels. If in the calculation any fractions of a carantano remain over, they may be counted in, with the addition of ¼, ½ or ¾ as the case may be, to make up an entire carantano. The sum total of the several prices calculated in this manner must be written as the price of the medicine, not only upon the prescription, but also on the directions to be fastened each time to the medicine. The fraction of a carantano which may be left over on the sum total, may be calculated as an entire carantano. Whoever has prepared the medicine in the Apothecary's shop, must write his own name, besides the price of the medicine, on the prescription.

VIII.

Taking into consideration the exactness and precautions necessary in weighing and mixing minute doses of very strong medicines, the Apothecary, or whoever else is bound by the Tariff of medicines, is allowed to count in the calculations of the several prices one entire carantano for each fraction of a carantano which may be left over according to the Tariff, on the total number of drops, or grains of those medicines which are marked with a cross in the Tariff, or in the Pharmacopœia, as well as of those medicines which in the Tariff are charged by grains, when they are prescribed by grains or drops.

IX.

In preparing and dispensing medicines, the Austrian medical weight prescribed in the Pharmacopœia must be rigorously adhered to. Whoever transgresses this rule, will be punished the 1st and 2nd time, as for a transgression of the Tariff (12 of these Regulations), and the 3rd time will incur the penalties threatened in 478 of the Penal Code.

X.

Medicines are allowed to be sold below the charge, but in such cases there must be written in figures on the prescription, and on the direction, in addition to the Tariff price, that to which it has been voluntarily reduced. It is forbidden, under a fine of from 10 to 50 florins, to offer to the public by advertisement any medicines contained in the Tariff at a price less than is there indicated. It will of course be understood that the medicines dispensed at less than the official charge are to be of the quality, genuineness and purity prescribed by the Pharmacopœia, and are also not to be lessened in weight.

XI.

Apothecaries in general are not to try to get customers by any clandestine or prohibited means, nor by bribes. Whoever transgresses this rule, will incur a fine of from 50 to 100 florins.

XII.

Each transgression of the Medical Tariff will be punished the 1st time by a fine of 100 florins, the 2nd by one of 200 florins, and the 3rd as a violation of the Penal Code.

XIII.

Whenever a pharmaceutical assistant shall, unknown to his principal, exceed the charges fixed by the Tariff, he will incur a fine of from 5 to 20 florins, or will be punished by an arrest of from 12 hours to 3 days, so long as he has not been guilty of any action punishable by the Penal Code.

XIV.

All Doctors publicly employed, as well as private Doctors, are charged with the special duty of watching that no transgressions of the Tariff be made, and in case they discover any, they must declare them to the political Authorities.

Notwithstanding, whoever has any reason to believe that in such respects he has received an injury, may prefer a complaint before the competent authority.

XV.

Doctors, or Surgeons authorized to keep the Pharmaceutical Chest and appliances in case of emergency, must get the chemical preparations and compounded medicines which they may require exclusively from Apothecaries, and must only consent to have them from them, with small books in which they write down all the preparations, giving the precise name and weight of the medicines, and the day of purchase, confirming them with the signature of the Apothecary. Apothecaries are obliged to sell to such Doctors and Surgeons the medicines which they require for their Pharmaceutical Chest, at 20 per cent. less than the price fixed by the tariff. With respect to Veterinary Surgeons, the present orders relating to them are to be rigorously observed.

Veterinary Medicines must never on any account be charged at higher prices than those fixed for them by the Tariff. In dispensing them, the charge for the preparation of prescriptions is not to be applied.

XVI.

Besides the above rules, regulations hitherto standing, referring to the procuring, keeping, and selling medical goods and medicines, are to remain in full force.

XVII.

The unauthorized sale of medicines for internal or external use; the sale of prohibited drugs, or medical goods of any unknown kind; the preparing and keeping medicines in any wrong or careless manner; the substitution of one for another, as well as the incautious sale of poison contrary to the regulations respecting it; or any negligence in keeping or separating poisonous goods, will be punished according to the Penal Code.

Date, 1855. BARON DE BACH, M.P.

After these remarks, follows the Official List of Medicines to be kept by Chemists and Druggists, with the Government price affixed to each article. The abbreviations used are:—

Fior.—Fiorino, Florin, one shilling and one penny—(like the British Silver Shilling in Jersey).

The rate of exchange is by no means constant. The Florin bears a different value in many of the Austrian and Papal States, as well as elsewhere. In England, for instance, it represents two shillings.

Car.—Carantano or Carantino, one halfpenny.

Quatt.—Quattrino, the fifth part of a carantano—(equivalent in value to a French *centime*).

Next comes the Regulation Price for preparing Receipts, in which the weights are similar to our own (Troy). ℈iij. are ʒj.; ʒviij. are ℥j.; ℥xij. are ℔j.

Lastly, there is a Tariff for *Containing Vessels* (bottles, boxes, &c.), another for Reagents, and a special one for Veterinary Medicines.

Marius amid the ruins of Carthage would be a fit emblem of an English Pharmaceutist placed under such a system: like the despairing Roman, with unavailing grief he would mourn departed grandeur, and unlike him, following out the modern instinct of the day, he would be prepared to emigrate. Where would be our home establishments, shorn of their patent medicines, their private formulæ and hereditary receipts? Farewell concentrations, prescriptions *secundum meam formulam*, and west-end prices. The law forbids them, and the sorrowing Chemist must restrain his wounded feelings, for he is in a land where the Government allows no Pasma. Nevertheless, the Austrian "Regulation" has its merits—order is established, mutual trade protected, and to a certain extent the public safety guaranteed. The grand fault lies in its doing infinitely too much, and it defends the Chemist's interest much as an army guards a beleaguered city, by placing it under martial law. We are not always in a state of siege.

The Englishman who visits for the first time the gardens of Versailles, or still better the exquisitely ordered grounds of an old French château, views with admiration the trim neatness of the walks, and the faultless pattern of the flower-beds. He is struck with the quaint hedges cut into fantastic shapes, and the long avenues of trees, allowed to grow almost as pretty, though not quite as natural, as the foliage of an Opera forest—and yet when the novelty of the charm is ended, he is content to return to his own green fields and smiling meadows: and if occasionally he is caught by a bramble, or stopped midway by an overhanging bough, he is consoled by the vista of the glorious landscape, where the paths "wander at their own sweet will," and the trees wave in the free air, as God has made them.

31, *Southampton Street, Covent Garden.*

THE INDIAN MATERIA MEDICA.

The Government of India pays upwards of £40,000 a year for quinine alone. Notwithstanding this vast expenditure, the supply might be tripled with advantage. Indents for quinine are jealously watched. At civil stations it is almost refused, and during an outbreak of fever it is always the first article to fall short, and the last to be sufficiently replaced. Of the cost of the remaining drugs we are not informed, but it can scarcely fall short of something like thirty lacs of rupees a year. These two figures are sufficient to prove the importance in an economical view of the substitution of native drugs. On the important benefits their introduction, or rather discovery, would confer upon the people, it is needless to enlarge. To the mass of the population English medicines are totally inaccessible. Almost alone among imported goods, drugs maintain the price they bore in the good old days before the Pagoda-tree had been shaken into barrenness. Men in sickness do not ask the price of medicine. The vendors have every interest in maintaining it. Doctors have little interest in its reduction, and so the good old profitable rates are allowed quietly to endure. The natives do the best they can, sometimes reviving under drugs that would kill any other race of human beings, but usually dying of attacks which the Englishman regards as temporary ills. The evil and its remedy are both understood, and have been pointed out about once a week during the half of the past century. Yet we have done nothing towards obtaining the remedy we all know to exist. There is probably not a medicine imported from Europe, not a costly drug from South America, which has not its counterpart in India. What have we done to discover them? Doctors living alone, without communication with their brethren, occasionally stumble on some valuable plant, some febrifuge or substitute for catechu. They cure all around, satisfy themselves of the correctness of their views, and report to the medical board. The white ants eat the report with gusto, the doctor moves on disheartened to his next station, and there the matter ends. It is useless for the advocates of these effete institutions to talk of the valuable investigations they have suggested or proposed. How many English drugs have they displaced within this generation? It is a result, not a report that is required, and the only one obtained is an immense expenditure. At the present moment there is a committee sitting to ascertain what articles now imported from Europe can be obtained in India. How many drugs will that committee condemn? We will venture to predict not one, though every member of it has probably some vague idea that all the English medicines can be replaced. We need an officer specially appointed for this duty, with power to make researches throughout India, and to compel the services to aid him. Usually all information obtained will be willingly placed at his disposal. It is hopelessness rather than want of energy which leads so many surgeons to leave their information inaccurate or half-digested. No man with brains to devote himself to study will submit his work to a board selected for its age, and still less to a board which is regarded as a sepulchre of records. It is individual persistent energy, solely devoted to this one subject, which can alone accomplish any permanent improvement. A skilled chemist, communicating with all India, testing every drug, and bringing all experience into one focus, would do more in a year to ascertain the true qualities of the native pharmacopœia, than the boards will accomplish in a century. Such an officer would be no very expensive addition to the staff of the medical service.—*Bombay Telegraph.*

ADULTERATION OF BUTTER.

A quantity of butter, which was seized at the shop of a dealer in Liverpool a few days ago by the officers of the Health Committee of the Town Council, was found, on being analyzed, to be thus constituted:—Butter, 47.4; chloride of sodium, 23.4; nitrate of potash, 0.8; vegetable matter, derived from Irish moss or other seaweed, with water, 28.3; total, 99.9. It was an importation from America.—*Times*, April 24th.

POISONOUS PROPERTY OF ANIMALS KILLED WITH STRYCHNINE.

One of the gamekeepers to Lord Middleton having poisoned some rats with strychnine, the dead bodies were thrown upon a heap of manure, where they were partly devoured by some poultry, which immediately fell a prey to the poison contained in the bodies, although these were in a half putrid state.

THE ROOT OF WATER HEMLOCK.

A DISTRESSING case of poisoning, by which the lives of two young men have been sacrificed, has occurred in the village of West Boldon, near Sunderland. John Snowdon, a farmer's son, and William Ridley, a labourer, went out on Wednesday morning to clean a hedge and ditch belonging to the father of the former, adjoining the Newcastle road, and about noon the same day they were found lying paralyzed and speechless in the field close to the ditch where they had been employed. There was a mark of blood on Ridley's face, and a black mark was forming round Snowdon's eyes. A carter saw them first, and, imagining that they had been fighting, gave an alarm, and assistance was brought to them. They were removed in a cart to the village, and medical aid was summoned, but both the poor fellows expired shortly after they were got into a house, and their bodies blackened all over. The medical men gave it as their opinion that both the unfortunate young men had died from the effects of a vegetable poison. A quantity of the water hemlock (*cicuta virosa*) grew in the ditch where they had been employed. One of them at least had been in the habit of eating some simple roots, and, from the fact that the root of the water hemlock was subsequently found with teeth-marks in it near to where the men had been laid after losing their consciousness, and that another piece of the same root was found in Ridley's pocket, there is no doubt whatever but that they were poisoned by eating the root of this plant in mistake for some other. Snowdon was only eighteen years of age; Ridley was thirty-five, and has left a widow with a small family but meanly provided for.—*Times.*

POISONING BY ARSENIC.

A CASE of accidental poisoning has recently occurred in King's County, Ireland. The following are the facts:—The Rev. James Alexander, LL.D., Rector of Tessauran, who was slowly recovering from a recent illness, sent, on the 16th of March, to the shop of Mr. Edward Whitfield, in Ferbane, for one pound of arrowroot. The shopman, Danis Grogan, not having so much in the bottle, took from a parcel a sufficient quantity of a white powder to make up the required weight. The supposed arrowroot was prepared in the usual way, and Dr. Alexander and his daughter partook of it; the latter, perceiving an unusual taste, ran up stairs in time to prevent her father taking more than a few spoonfuls. Miss Alexander promptly administered mustard emetics and took one herself. Drs. Fry and Peirce were sent for, and these gentlemen found a large quantity of mineral poison both in the food and in the powder which remained, and had no doubt that the portion taken from the parcel to make up the weight was arsenic. The butler and the cook, who also tasted the arrowroot, suffered severely. Miss Alexander is recovering, but Dr. Alexander died on Wednesday night, April 1. After an investigation at Ferbane petty sessions, informations were taken by the magistrates against Grogan for the misdemeanour of carelessly selling poison, whereby life was endangered. He was admitted to bail, himself in £40, and two sureties in £20 each, to take his trial at the next quarter sessions. His master was tendered as surety, but was rejected, on the ground that it might be proved that a similar legal offence had been committed by him, in the careless manner in which he kept articles of food and poison together for sale. Whitfield is described as a grocer, who was in the habit of selling poisons (such as are used by farmers) and medicines of various kinds, and since the accident, rice, corrosive sublimate, jalap, and oxalic acid in different papers, were found in the same drawer, and all under the care of an ignorant boy. The investigation was adjourned to the 13th instant, for the purpose of having the tissues and blood of the deceased examined by Dr. Geoghegan, who stated that he had found arsenic in abundance, both in the arrowroot and in the gruel prepared from it, but had been unable to discover a trace of the poison either in the contents of the stomach or in the viscera, but all the circumstances taken into consideration, left no doubt on his mind that death in the present case was the result of arsenical poisoning. The following is the verdict of the jury: "That on the 16th of March, 1857, a messenger named Charles Quinn was sent from Killy-galley to the shop of Mr. Edward Whitfield, of Ferbane, to purchase arrowroot, which he received from Mr. Whitfield's shop-assistant, named Denis Grogan. That the said Quinn took the arrowroot to Killy-galley, and delivered it to the daughter of the Rev. James Alexander, who had made it into food for her father, which was given to him. That the arrowroot so given contained a quantity of mineral poison, to wit, arsenic, wilfully and without due caution so delivered to the said Quinn by the said Denis Grogan. That the Rev. James Alexander shortly after got ill, having eaten of the food, and languished until the 2nd of April, when he died from the effects of poison so mixed through the arrowroot aforesaid, and not otherwise.

"We cannot separate without deploring the unhappy occurrence which gave rise to this inquiry, and are of opinion that the existing laws are quite defective, permitting as they do the sale of poisonous drugs by grocers and other unqualified persons; and that improved legislation on the subject is most essential."

POISONING BY AMMONIA.

An inquest was held on Saturday, April 18th, on the body of Mr. James Thompson' son of Mr. Thompson, of Rhodes Street, Halifax, who died from the effects of a large dose of ammonia. The deceased had been in a low desponding state for two years, and had refused to take any medicine save what was given him by Dr. Garlick, the medical attendant. A few weeks since some ammonia was purchased by Mrs. Thompson, for use, when mixed with water, as an external application. The deceased took the bottle, and expressing a belief that it was just the medicine to cure him, was about to drink off a wineglassful, when the servant prevented him. The bottle was then locked up in the cellar; but on Saturday, the servant inadvertently left the key in the door, and deceased procured the bottle, and drank a large draught. He expired in a quarter of an hour afterwards.

The jury returned a verdict, to the effect that deceased drank the poison under a belief that it would do him good.—*Manchester Guardian.*

POISONING BY THE ROOT OF BELLADONNA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—As a record of cases of poisoning is generally important as a matter of reference, will the following rather extraordinary and nearly fatal one, arising from the ignorant administration of a decoction of *the roots* of the Atropa belladonna, possess sufficient interest to merit a place in the pages of the *Pharmaceutical Journal?* As exhibiting the rather rare effects of the roots of this plant, it may be perhaps worthy of insertion. On Monday morning last I was requested by a very intelligent medical gentleman of this town to visit with him a case of suspected poisoning by the decoction of the roots of some unknown plant, a very small portion only of which had been sent to him. It appeared that the father had gathered what he supposed to be the roots of the Comfrey (*Symphytum officinale*), but which, on inspection of a part of the root with the young leaves attached, which they had in the house, I immediately recognized to be belladonna, about, perhaps, 2 oz. of which, after slicing, he boiled in water. A portion of the decoction he gave at bedtime to his son, a youth about fourteen years of age, and another portion he took himself. After the lapse of about three hours, the boy (who, it must be remarked, had been previously sick) complained of pain in the belly, dryness of the mouth and throat, and was attacked with *furious delirium*. The pupils were *remarkably dilated*, the *irides insensible to light*, and the vision disturbed. The pulse ranged from 120 to 130, and the countenance appeared anxious but vacant. The father was also, after a rather longer interval, attacked with vomiting. He complained of no especial pain, although the pupils of the eyes were dilated, and the iris not acted upon by light in its natural manner. These symptoms were much less strongly marked than in the son. He complained most especially of numbness of the face and arms, weakness of the legs, and staggering. After a persistence of these symptoms in the case of the father for perhaps six or eight hours, and in that of the son for twelve or fourteen, they gradually abated, and a slight stupor or lethargy passing off, no other unpleasant feeling remained.

I am, Sir, yours respectfully,

Dudley. E. Hollier.

TAMPERING WITH POISONOUS MEDICINES.

On Friday, at the Mary Queen of Scots, in the parish of Jarrow, near the old toll gate in Gateshead, an inquest was held on the body of Elizabeth Bowman, aged 77, the widow of a husbandman. Deceased was an industrious, hard-working woman, going out to wash, and labouring in her humble vocation up to the close of the past week. She suffered from chronic cough, and felt weak and unwell on Saturday night. At a late hour her daughter, Mary Bowman, purchased for her a pennyworth of "paregoric" (the camphorated tincture of opium) of Mrs. Fenwick (a quarter of an ounce), the whole of which she took at once. She then fell into a profound sleep, under symptoms which inspired alarm; and Mr. Robinson, surgeon, was called in. He found her breathing stertorously, the pupil of the eye widely dilated, the action of the heart slow and laboured, and the whole body in a state of collapse. Suitable treatment was resorted to, but she never rallied, and died on Monday forenoon. The dose of paregoric would not account for death in a younger and more robust person, but in so old and weak a subject as the deceased it might hasten dissolution. The cause of death he should say was serous apoplexy. It was not commonly known, Mr. Robinson observed, among persons who made use of "paregoric elixir," that it was a preparation of opium, in combination with camphor, another powerful sedative. Improperly administered, it was a dangerous medicine, yet, when he was called in to the deceased, and asked if anything had been given to her, the answer was that "she had only taken some paregoric." In reply to the coroner, Mr. Robinson observed, that if no more than a quarter of an ounce had been administered, the quantity of opium taken would be half a grain; but he understood at first that the dose was half an ounce. Deceased's daughter stated, on examination, that her mother objected to laudanum, and when recommended to her by a neighbour, refused to take any. She was not aware that paregoric was a preparation of opium. Mrs. Fenwick, it appeared, dealt in laudanum, but the coroner and jury were satisfied that no mistake had been committed; that paregoric, and not laudanum, had been administered to the deceased. The verdict was therefore "Death from serous apoplexy, hastened by paregoric;" and the foreman (Mr. Guthrie) expressed his opinion that some restriction should be placed on the sale of poisons. He thought it wrong to allow any and every person, however ignorant on such subjects, to vend the most dangerous drugs.—*Gateshead Observer.*

[We insert the above for the purpose of showing the disposition which exists to exaggerate the danger resulting from the sale of ordinary medicines, as "paregoric" can scarcely be called a dangerous poison; and it appears that in this case the quantity taken was less than the maximum dose.—Ed. *Pharm. Jour.*]

PHARMACY IN DURHAM.

We have received the following from a correspondent; and although the meeting appears not yet to have produced all that is desired, we trust the movement will not be lost sight of, and that the desire for improvement in the knowledge of Pharmacy will be attended with the success it deserves:—

"At a meeting held on Thursday evening, February 12th, the following requisition and resolutions were unanimously agreed to:—

"*To the Local Secretary of the Pharmaceutical Society.*

"We, the undersigned Apprentices of the Chemists of the city of Durham, having conceived it necessary that greater facilities ought to be given for the study of Chemistry, Pharmacy, Botany, and the collateral sciences, so as to fit us for the examinations of the Pharmaceutical Society of Great Britain, and the better discharge of our duties, held a meeting, when the following resolutions were unanimously agreed to:—

"That the Apprentices form a class, to meet not less than once a week, for improvement in the knowledge of Chemistry, Pharmacy, Botany, and the allied sciences.

"That the Local Secretary of the Pharmaceutical Society be requested to communicate with the heads of the different drug establishments for furthering the above object."

MATTHEW ROBINSON.

A.D. 1628.

"*Le Médecin malgré lui.*"

The Spanish proverb says, "Old books to read; old wine to drink; old friends to meet." Great is the pleasure of welcoming old friends; of old wine I can give no opinion, as I so seldom get it; but privately I respect the venerable Spaniard, who has mentioned first, Old Books.

The Autobiography of Matthew Robinson is one of these. Fortunately part of his history relates to Physic, and affords a curious illustration of ancient Pharmacy.

Unlike some scholars of a later date, he was a sort of genius while a child; "and such was his ripeness of wit, that before he was nine years old he could translate any English into true grammatical Latin, and construe any familiar author. His father perceiving it, took pleasure in trying him with curter and more difficult Latinists, as Terence and Seneca, and did admire to see how the boy would nick off the very sense of difficult passages, wherein others, three or four years older, could do nothing." Being sent to a higher school, "the holidays and playdays were to him desirable for no other end but that he might be at liberty to read what he list; and by this course he was familiar with every poet and every poetical expression, so that he might have passed for a Laureat ere he was thirteen years of age." His father, "a stout and popular gentleman," died, and his mother was persuaded to send her son to Edinburgh. This was the inglorious time of the civil wars, when Cromwell amused himself with hunting Royalty. Learning was at a discount, arms triumphant, or, to use the expression of the age, "the tents of Mars were more frequented than those of Minerva." Matthew Robinson, however, reached Edinburgh in safety, and began his studies in October.

In February next year the plague broke out, and the students hastened home. "His mother gladly received her son, though much Scottified in his habit and language. Neither was he one day idle at home, but read over at leisure his tedious notes, yet much longed to go to the English Universities." Therefore he set off for Cambridge, not by the Eastern Counties Railway, but mounted on a sorry horse. On the first day he and his companions were chased by robbers. Next day he came to a garrison town, where he was kindly received by the governor, but "appointed to such a mean quarter, that he could take no rest for swarms of night enemies" (the nature of which the Chronicler does not leave to the imagination). He now made for Peterborough; but the very night of his arrival the troops came in, and, by a simple process of displacement, Robinson turned out, and finally, after some adventures, reached Cambridge safely. Entered at St. John's College, he was placed under "the tuition of that darling of men, Mr. Zachary Cawdrey. The tutor doted on his new pupil, and he on his tutor; and to his study then he fell."

Scarcely had he settled to his new pursuits, before the king's army (Charles I.) marched before Cambridge. The students flew, Robinson amongst the rest; but being three times dragged back by the peasants, he determined to fight like an honest man, mounted guard at the Castle by night, and continued his studies by day. The wonderful narration of his varied diligence must be passed over, such details being foreign to the purpose of this Journal. When next we meet him, he is "out of love with College life," and expecting nothing but ruin to the Church by the present times, he betook himself from that occasion to the study of physic. After having witnessed the trial of King Charles, following the English fashion of the day, he was bent on going to Padua as a Doctor, but College interest changed his prospects, and he became a Fellow. "Being thus posted to his own desires, he fell to the perfecting all his former studies. The one he mainly pursued was Physic, his intended profession, and therefore proceeded in drugs as he had done in herbs, and in all Pharmacopœias, acquainting himself with Apothecary shops, and the nature of compounded medicines, and chemical experiments; and in Anatomy he was the most exquisite inquirist of his time, leaving no anatomist unread, nor secret unsearched; insomuch that he was invited by some learned persons in other colleges, many years his senior, to show them vividisections of dogs, and such like creatures in their chambers, to whom he showed the whole history of the circulation, the venæ lacteæ, the cutting of the recurrent veins in the neck, with many experiments then novel, to great satisfaction; and no augur ever was more familiar with bowels than he, every week having some singularity or other of this nature to search in." These pursuits were not destined to last for ever, for, says the record, "it pleased the most wise God (whose counsels designed him for better employ) to give a sudden check to this his career in medicinal studies, by the vacancy of a church living in his native country, belonging to his family, the presentation whereunto was left to him, as his chief portion. This he thought the greatest affliction that had ever befallen him, to leave his present paradise, and change his course of life and studies: yet the importunity of his mother and dearest relations called him down, and would receive no naysay." The delicate allusion to the profession will not be overlooked, nor when one's mother and one's interest row in the same boat, is the result difficult to foresee. Robinson yielded quietly to his fate, and at the age of twenty-three forsook medicine for divinity. But there is a French proverb, quite as good as the old Spanish one—"On revient toujours à ses premiers amours." And so strong was the ruling passion in him, that the times being "turbulent and factious, so that all sober men judged that it was a deadly crisis, prognosticating nothing but the ruin of both churches and universities, he then sold all his household stuff, and fully prepared in two months' time to resign his living to a worthy and pious divine, his neighbour, and to betake himself to the College again, and his last reserve, the study of physic." Such hopes were never realized—once having entered the ministry, his conscience would not allow him to reject it: with a noble disinterestedness he gave up his fellowship to prevent further temptation, and became "a right textman and practical preacher." Now for the strangest part of the narrative, showing how dangerous is reputation—the public *would* be physicked by him, and the following is the account of a practitioner *nolens volens*, from the original manuscript.*

"He was no sooner settled in his place, but he met with a great diversion to his ministerial employ, for not only friends and relations, but many others well knew that he was brought up a Physician, and therefore consulted him often in their distempers and infirmities; and though he could not peremptorily decline such importunities, yet he did with much modesty answer their desires, yet still referring them to the advice of more experienced Physicians for many years. But his name being once up, he could not continue himself longer in that privacy. Among many gentlemen thus applying to him was Sir Joseph Cradock, the Commissary of the Archdeaconry of Richmond, who often consulted him for himself and family with great success; but finding him shy and nice in writing bills (*i. e.* prescriptions) or anything that looked like a professed Physician, he sent to him under the seal of the office a license to practise physic, that he might not have any excuses longer, and this proved to him a great unhappiness. For he was sent for by some dukes and peers, with many baronets, knights, and great men upon the like account; some of whom (as being at too great a distance) he absolutely refused, others he was induced to gratify, that of friends he might not make them enemies. Insomuch that in short time, he had but little time left him to his own studies, being three or four days per week, and often more, carried unwillingly abroad to visit patients. In his medicinal practice he had prodigious success, especially in the checking and curing of consumptions (being well instructed from his own hectical constitution, as well as from books): and in that he had a peculiar method of his own, known then to few, or none, but such as after took it up from him. No man had a steadier judgment of pulses and patients, for he could see danger at a great distance, and rarely missed in his prognostications, and therefore, in all such cases, he pressed the counsels of abler Physicians. And though he refused to undertake the cases of many patients, seeing them desperate, he never denied any to join in counsel with the most learned Physicians of the land; often reporting those odd cases of patients even to the College of Physicians, by a polite Latin pen, whereof he was a great master, as well as of the Latin tongue."

One more extract will complete the scene:—

"But his concerns still growing upon him, both at home and abroad, he was very weary of these avocations given him by patients, studying all honest excuses to shift them off, yet could he not fairly rid himself thereof for twelve years, till it pleased God, about the fifty-fourth year of his age, to give him a writ of ease." This was a painful malady, which "prevented him from walking, coaching, or riding," and which, by setting him free from his professional labours, at last restored him to the church.

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* *Autobiography of Matthew Robinson.* Edited by J. E. B. Mayor, M.A., Cambridge.

This wonderful man united in himself many seemingly anomalous characters—though learned, he grew rich; though rich, profusely liberal. He was a noted judge of horses, an accomplished sportsman, and a celebrated divine—how excellent a Physician has been seen already.

A light that shone so brightly in the seventeenth century, deserves not to be forgotten altogether in our own. JOSEPH INCE.

31, *Southampton Street, Covent Garden.*

REVIEW.

ELEMENTS OF CHEMISTRY, THEORETICAL AND PRACTICAL. By WILLIAM ALLEN MILLER, M.D., F.R.S., Professor of Chemistry in King's College, London. John W. Parker and Son, West Strand.

WHILE publishers and authors are generally endeavouring to meet the popular demand for small books and works of easy reading, we are glad to find that the old-fashioned thick octavo is not altogether replaced by the modern manual.

Dr. Miller's work forms three octavo volumes, containing upwards of 2000 pages. It belongs to the class of the larger and more complete systematic works on Chemistry, designed for the use of students. The work is divided into three parts. The first part treats of *Chemical Physics*, the second of *Inorganic Chemistry*, and the third of *Organic Chemistry*.

The part treating of *Chemical Physics* is more copious and complete than any other modern elementary work on the same subject in the English language. It bears some resemblance to that part of the late Professor Daniell's *Introduction to Chemical Philosophy* relating to physics. Indeed, the author states that, as he was "originally a pupil of Professor Daniell, and was subsequently, for several years, associated with him as Lecturer on Chemistry, it has happened that in some of the subjects treated of in this volume, the thoughts and mode of arrangement resemble those adopted by that distinguished philosopher." It must not be supposed, however, that Dr. Miller's work forms a new and modernized edition of, or even that it is founded upon, Daniell's very excellent and once popular treatise. The present author, equally with his predecessor, possesses the power of well arranging, and lucidly yet concisely describing the subjects of which he treats; and any resemblance between their respective works may be referred to this, and to the fact of their having long worked and lectured together, rather than to a copying by one of the style and matter of the other. Moreover, it is only in the first, or physical part, that the reader is reminded of Daniell's mode of treating the subject. This was the best part of Daniell's work, and it is a very important part of the work before us, occupying as it does upwards of 400 pages. The student will find here a clear exposition, well illustrated, of the results of investigations in chemical physics, brought up to the period of publication.

The part treating of *Inorganic Chemistry* occupies about 750 pages. The arrangement here partakes somewhat of a natural historical character. The principles of chemical nomenclature having been explained, the student is led to examine the atmosphere, to determine its composition, and to study its principal constituents, oxygen and nitrogen. He is then taken to the examination of water, and of the element hydrogen. From thence to carbon, carbonic acid, and carbonic oxide. Then follow the compounds of nitrogen with oxygen and hydrogen, and the other non-metallic elements and their compounds. Before entering upon the individual descriptions of the metals, the author gives a chapter upon the general properties of this class of bodies, and of their compounds with the non-metallic elements, and explains the theories of the constitution of salts. Exception may perhaps be taken to the classification of the metals which is adopted, but all such classifications are more or less defective. The author, after respectively grouping together the metals of the alkalies, alkaline earths, and earths, forms a group of "metals more or less allied to iron," which includes zinc, cadmium, cobalt, nickel, uranium, iron, chromium, and manganese, then gives a group of "certain metals which form acids with oxygen," a separate group of "bismuth, copper, and lead," and lastly, the group of "the noble metals." It may be doubted whether this is the best classification that could be adopted, or, indeed, whether any advantage results from grouping the metals in this way under definitions which are obviously imperfect and tend to convey erroneous impressions to the mind of the student. This part of the work contains a great deal of valuable practical information, and fully justifies the designation adopted in the title of the book.

The last part, which treats of *Organic Chemistry*, is that which might be expected to present the greatest difficulties in making a satisfactory selection and classification of matter. We congratulate the author upon the successful issue of his labours in this department of the work. The arrangement, although dissimilar to that of any other author that we are acquainted with, is, we think, the best that could have been adopted, considering the object in view, and the present condition of the subject.

Dr. Miller's work is a valuable addition to our chemical literature. It will supply the student with a manual adapted for his advanced studies, and may be consulted with advantage by the practical man, who will find here a comprehensive summary of facts, and ample details relating to the most important processes in the arts and manufactures.

TO CORRESPONDENTS.

We have received an anonymous communication, inclosing a specimen of extract of taraxacum, but for what object we cannot tell.

Amator Scientiæ thinks the one thing wanting to make good Chemists to be "one fold, one shepherd," to consist of a Training School for Youths, and a College for Pharmaceutical Students; private apprenticeship to be abolished, and the premiums paid to the general funds of the College ! ! !

J. F. (Newton).—(1.) The *Floræ Capensis* is not published in this country.—(2.) The references alluded to are to botanical authorities—Nees von Esenbeck, and Stephenson and Churchill. The price of the work of Nees von Esenbeck is about £15.

M. (Poole).—Distillation would answer the purpose.

T. (York).—(1.) Lindley's *School Botany* is suitable for a beginner.—(2.) See page 536 of our last number.—(3.) The expense of attending the School of Pharmacy for a session would greatly depend on the habits of the student; with economy, probably £80 (including a moderate sum for board and lodging).

J. T. (Hastings).—The books most suitable are mentioned at page 440 of our February number, and may be obtained through any bookseller.—(2.) Yes.

An Australian (Strand).—(1.) Dissolve in nitro-hydrochloric acid, and precipitate with protosulphate of iron.—(2.) Evergreen.

A Member.—We have no formula for "egg powder."

Chemicus (Scarborough).—*Gingerine.* See vol. xv., page 192.

L. O. (Great Malvern).—We know no formula for Arnica Plaster. It might be made in the same manner as Emplastrum Belladonnæ.

A Member (Pershore).—(1.) A clear solution of potassio-tartrate of iron in syrup may be made by first adding a small quantity of water.—(2.) *Unguentum Potassii Iodidi*, if made according to the Pharmacopœia, is colourless, provided pure lard be used.

W. L. (Dundee).—The receipt of the article from the *Glasgow Herald* is acknowledged with thanks.

X. Y. Z.—(1.) Certainly not.—(2.) Sumbul root, ℥ij.; proof spirit, Oj.

A Lady.—We fear that the only remedy is time.

Instructions from Members and Associates, respecting the transmission of the Journal, to the Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd) to Mr. Churchill, New Burlington Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XVI.—No. XII.—JUNE 1st, 1857.

LEGISLATION AGAINST POISON.

We have printed entire, in another part of this number, the "Bill intituled an Act to Restrict and Regulate the Sale of Poisons," which was alluded to at the Adjourned Annual Meeting of the Society on the 22nd of May. The Bill was not printed in time for discussion on that occasion, as copies of it could not be obtained until after the close of the meeting. It will be the duty of the new Council at the first meeting, to be held on the 3rd of June, to consider the provisions of this measure, and to take such steps as may appear expedient for protecting the profession and the public against such an infliction. The subject will also be discussed at a Special Pharmaceutical Meeting, to be held at the house of the Society, on Wednesday evening, June 3rd. Although it cannot be supposed for a moment that the Bill is at all likely to be passed in its present form, yet the principle displayed in it may be taken as an indication of the direction in which legislation is tending, and the experience of those who are practically conversant with the subject must be brought into requisition to expose the absurdities of the measure, and to point out the boundary-line between the sublime and the ridiculous.

That it is desirable to place some check upon the facilities for obtaining dangerous substances, and to adopt the most effectual precautions that can be devised against accidents in the use of domestic medicines, is a proposition which admits of no dispute; and it should be the primary object of any measure which may be introduced for the purpose, to increase the difficulty of criminal poisoning without needless interference with the prerogative of the medical profession, the requirements of art and science, and the general convenience of the public.

No professional sagacity is required to expose the impracticability of some of the proposed regulations in the Bill now before us. This has been forcibly pointed out in the *Times* of May 22nd, where the dilemma of a person requiring a few drops of laudanum for toothache or any other ailment is described by way of illustration. This, however, is only one instalment of the perplexity; a new "field of usefulness" (?) is here imposed upon the clergy and on justices of the peace, who will be liable to be called upon at all hours for certificates by persons requiring poison, whether for medicinal use, for purposes of trade, or for scientific processes. It may be a question with medical men when thus applied to whether the certificate does not imply or include professional advice, entitling them to a fee. It will of course be necessary to have printed forms of certificate, and in consequence of the difficulty of obtaining the medicines enumerated in Schedule A in cases of emergency, prudent persons will find it expedient to be provided with a stock of such medicines, so as to avoid the dilemma described in the *Times*, and as the supply of all articles of consumption is regulated by the demand, we may expect to see advertised among other domestic remedies, "Convenient travelling chests, containing all or any of the medicines in Schedule A, in angular blue bottles, with black and white labels, as the Act directs."

The provision that all the scheduled poisons are to be kept in a separate place under lock and key will entail upon the dispensing Chemist an amount of inconvenience which our readers will generally appreciate. It may be very proper that some dangerous substances should be so kept, but by including in the list a variety of medicines which are in constant use, the closet or poison chest would be continually open, to the great alarm of the public if in the front shop, or the no less inconvenience of the dispenser if in a remote part of his premises.

While these theoretically conceived restrictions would impose upon the honest and suffering public an incalculable amount of inconvenience, the list of excepted poisons in Schedule B, and the proviso in sections 8 and 9—not to mention the innumerable catalogue of poisons to which the Act is inapplicable—would leave the criminal poisoner in full possession of all the facilities which he could desire for his purpose. The fact that poison certificates are in constant requisition by persons of all classes would remove suspicion in each case, and the notoriety of the various legitimate purposes for which poisons are daily used, would be a convenient cloak for the criminal, who might refer to the 11th section for a pretext, in case of need.

The natural result of such an Act of Parliament would be an extension of the public familiarity with poisons, and such familiarity would tend more to assist the criminal poisoner than it would to protect those who purchase poisons for legitimate purposes.

The impracticability of the angular and blue bottle scheme, as a regulation for universal adoption, has already been pointed out; and, even if it were practicable, it is simply an expedient for superseding the use of the senses, and enabling careless nurses to administer medicine without taking the trouble of reading the label. It would also give a fallacious confidence in the contents of round bottles, which, although they might not be included in Schedule A, would in many instances require quite as much care and accuracy in the use.

The form of certificate in Schedule C is signed by the vendor a "licensed Druggist." What is a licensed Druggist? By whom is he to be licensed? Does it mean Pharmaceutical Chemist, or is it in contemplation to empower the clergy or justices of the peace to grant the license to any huckster or oilman who may have a corner of his shop dedicated to Schedule A?

The responsibilities provided by the Bill are very severe. For the sale of any poison save as authorized by the Act—that is to say, without the required certificate, entry, signature, &c., or in a bottle of the wrong colour or shape, or without a label such as the Act describes; for failing to keep any poison under lock and key; or for any other infringement or evasion of the Act, the penalty is not exceeding £20 for the first offence, and £50 for any subsequent offence. *The person so convicted of any second or subsequent offence is to be for ever thereafter disabled from selling any poison, or carrying on the business of a Chemist and Druggist*; and a person so disabled is to be liable to a penalty of £50 if he should at any future time sell any preparation containing poison, or any drug or medicinal substance whatsoever!

If such an Act of Parliament should be passed, and not duly enforced, it would resolve itself into a Pharmacopœia for the instruction of criminal poisoners; if enforced strictly to the letter, every Chemist and Druggist in the kingdom might expect within twelve months to be legally "disabled" from carrying on the business, and the race would become extinct.

Whatever may be the fate of the Bill, its appearance as a literary curiosity will serve to demonstrate the extreme difficulty which attends legislation on this subject. Practical men were previously aware of the difficulty, and have never aimed at the utopian scheme of superseding the ordinary use of the senses by parliamentary precautions no less complicated than ingenious. To theoretical legislators, therefore, we are indebted for this effort of imagination, which, when submitted to the test of experience, will be found to be based on erroneous principles.

In reverting to the various cases of accidental poisoning which from time to time occur, and of which we have lately published a number of examples, it will be observed that in a large proportion of the cases the accident may be attributed to the sale of poisons by incompetent persons, or to the neglect of some ordinary precaution, such as labelling the bottle or giving proper instructions as to the dose. In the Bill before us no allusion is made to the qualifications of the parties by whom poisons are to be sold, nor to the distinction which is now recognised by Act of Parliament between Pharmaceutical Chemists and unqualified persons who sell drugs by sufferance. The introduction of the term "licensed Druggist" shadows forth an imaginary distinction, which may be beneficial or injurious, according to the mode in which the idea is developed. The precautions proposed to be enforced are of that complex nature which it would be impossible universally to carry into practice, and every deviation from the supposed system of restriction would give rise to a fresh source of danger. For example, it is assumed in theory that a bottle of the right size and of the shape and colour defined by the Act, will always be at hand whenever any poison is to be sold, and that such bottles will not afterwards be used by the public for any other purpose. Practically it is well known that this will not be the case, and that consequently the precaution, if *relied upon*, would be worse than useless. The proposal to colour all poisons with indigo, soot, or archil, is too absurd to be seriously discussed in this Journal.

We have not attempted, on the present occasion, to criticize minutely the details of the Poison Bill, or to add anything material to the opinions which we have previously expressed as to the nature of the remedy which we consider best adapted to the object to be attained. The subject will shortly be discussed by the Council, and will also be brought under the notice of the Members at large, which will afford an opportuity for reducing into a practical form the result of the experience of those who are best acquainted with the subject.

The following extract from the article to which we have already alluded in the *Times* of May 22, directs attention to the most important and practical aspect of this question:—

"We place much reliance upon the gradual extension of scientific and general intelligence among the Druggists as a class, and regret that the trade cannot be brought under more stringent regulation, for no restraint of police or statutory check would be so efficient as that check and that restraint which educated Druggists would themselves supply. It is not absolutely necessary for the public convenience that deadly substances and drugs should be sold at every village shop, and we think some provision for confining the sale of such articles to properly accredited establishments might be introduced with advantage."

THE PRIVILEGES OF PHARMACEUTICAL CHEMISTS.

When a class of persons, after protracted efforts, have succeeded in obtaining a certain amount of advantage—whether it be position, influence, or substantial privileges—it is policy to continue to look forward and make the best use of the step already taken. While some of the parties concerned may be disappointed that greater progress has not been made, and others may be content to be spared any further trouble, those who are steadfast in the cause never lose sight of the original object of their ambition until their exertions have been rewarded by complete success.

The Pharmaceutical Chemists in this country have made a step in advance, and were never in a more favourable position for extending their sphere of usefulness, and rendering a service to the public, than at the present time. The House of Commons is paralysed by the mystification of Medical Bills; the House of Lords is floundering among narcotics; the Press is uneasy on the subject; and the Public is more or less affected by the panic to which recent disclosures in parliamentary reports, sanitary commissions, and coroners' inquests have given rise.

Certain projects are under deliberation emanating from parties not practically conversant with the subject on which they have undertaken to legislate. The experience of the Pharmaceutical Chemist is required to solve the difficulties which have arisen, and to point out to what extent and in what manner a remedy may be most judiciously applied to meet the requirements of the case.

In coming forward under these circumstances to assist in the undertaking, the Pharmaceutical Chemists will, at the same time, confer a benefit on the public, and advance their own position and influence. No legislation on this subject can be effectual or consistent unless it recognises a qualification for dealing in poisonous medicinal substanes. It would be absurd to inflict a penalty of £10 for selling a quarter of an ounce of laudanum in a bottle of the wrong colour and shape, and at the same time to permit an illiterate apprentice in a huckster's shop to serve arsenic, nux vomica, arrowroot, oxalic acid, or Epsom salts, to any customer who may apply, even if provided with a certificate and a witness. The primary and most important question to be considered is—to whom should be entrusted the responsibility of selling and compounding those medicinal substances which are comprised in the list of poisons? It should be the policy of our members, whenever such questions arise, to come forward and take the position which the law has given them as the representatives of Pharmacy, claiming to be recognised in any Act of Parliament that may be passed with reference to the sale and dispensing of medicines, and offering such assistance as their experience may enable them to afford on the subject.

Some Members, however, instead of taking this course, appear to undervalue their privileges, and amuse themselves by scrutinizing the statistics of the Society, with a view of proving, if possible, that it is in a retrograde state. They deduce this inference from the fact that a few mushroom supporters, who came in at a moment of excitement a few years ago, evaporated like dew before the sun at the sight of the collector. But it is important to remember that the intelligent and influential Members remain, and that the moral and professional influence of the Society are daily increasing. It may be a question for serious consideration in what manner grocers, hucksters, and other incompetent persons are to be restricted in the sale of poisonous drugs, and whether any system of licence shall be adopted with reference to this branch of trade; but there can be no doubt as to the position and status of Pharmaceutical Chemists, who are at the present time acknowledged by law to be qualified, and who are the parties most capable of assisting the Legislature in the settlement of this question. An extension of the privileges of this class would conduce to the public benefit by inducing a larger number to qualify themselves, which would gradually increase the supply of trustworthy dispensers of medicine.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS (*continued*).

Bell, James	Manchester
Bentley, Walter	Brighton
Goode, Charles	Congleton
Hambrook, John Baker	Dover
Hall, Robert	London
Parkinson, Robert	Bradford
Rowntree, Thomas	London
Willows, John	London
Williams, Thomas	London

CONVERSAZIONE.

A Conversazione was held at the house of the Society on Tuesday evening, the 19th of May. Among the subjects provided for the entertainment of the company on this occasion, electricity and photography were most prominent. Very powerful galvanic batteries were used for showing the electric light and for charging the great electro-magnet, and a very powerful induction coil. A battery, consisting of eighty of Grove's cells was employed for the electric light, which was kept in operation, with a few intermissions, throughout the whole evening. A good deal of attention has been given to this subject lately by electricians, with a view to the construction of apparatus for rendering the light constant and uniform. Two of the instruments intended for this purpose were in use on the present occasion—one contrived by Mr. W. Squire, and the other, a modification of Mr. Squire's apparatus, by Messrs. Murray and Heath, of Piccadilly. Mr. Squire superintended the use of these instruments, and showed that the light can be maintained with very little variation, and only an occasional intermission, when it may be immediately restored by an attendant. A splendid beam of pure light was thrown from one of the windows of the house in different directions to a great distance, to prove its applicability for lighthouses and other similar purposes. The same battery that was used for the light was at intervals applied to the great electro-magnet, with which some of the results of the magnetic force were shown.

Other effects of electricity were exhibited in a darkened room, where a powerful Ruhmkorff's coil was used for giving to galvanic electricity a high degree of tension, resembling in this respect the electricity of the machine. The induction coil was kindly lent for the occasion by Mr. Gassiot, and the experiments were shown by Mr. Ladd. In this room experiments were also made by Messrs. J. L. and L. Wheeler, of Brixton, with their new gas-carbon battery, which is a modification of Grove's battery. This battery was described a short time ago at a meeting of the Chemical Society. The platinum plates of Grove's battery are replaced by plates of coal-gas carbon (the hard carbon which is deposited on the inner surface of coal-gas retorts). In this way the great expense of Grove's battery is avoided, while the power appears to be undiminished.

In connexion with the subject of electricity may be mentioned the magneto-electric step-by-step telegraph, which was exhibited by Mr. Siemens, of John Street, Adelphi. This instrument possesses the advantages of great simplicity, entire suppression of the battery, and capability of working through a great length of line-wire (having been worked through 3000 miles) without intermediate relays. It is intended chiefly for railway companies and private telegraphs, requiring only one line, and being always ready for work. The instrument called the indicator consists of two permanent magnets fixed to a frame, with the opposite poles turned towards each other, between which are placed the moveable poles of an electro-magnet. Positive and negative currents passing in succession through the coils of the electro-magnet, cause a reciprocating motion of these poles, which are therefore successively attracted by the two permanent magnets. By this motion a needle is turned on a dial step by step, showing the different letters and signs. The electric current is produced through a second apparatus called an indicator, which consists of several permanent steel magnets, having one common anchor made of a soft iron core covered with insulated copper wire, and fixed so as to revolve in two bearings. This anchor is turned by means of a wheel and pinion through the crank fixed over a dial, showing the letters and signs corresponding with the indicator. By each half revolution of the anchor a current is produced alternately negative and positive, which passes through the coils of the indicator, moving the needle as mentioned above.

There were also specimens of all the submarine telegraph cables, which were contributed by Mr. Bentley.

Another application of electricity was exemplified by a series of very beautiful electrotype copies, in copper, of sculpture in *alto-relievo*. These, which are of French production, are some of the best specimens of the art we have seen. They were exhibited by Mr. Richard Knight.

The display of photographic pictures and stereoscopes comprised the productions of the most eminent artists in this department, including Mayall, Maul and Polyblank, Kilburn, Hughes, Williams, Knight, and others. From these sources were derived a large collection of portraits of eminent men, and pictures of all sorts. Messrs. Murray and Heath, Messrs. Horne, Thornthwaite, and Co., and Mr. Piggot also contributed to this part of the collection; and Mr. Olley contributed some well-executed micro-photographs.

Mr. Bower, of Tottenham Court Road, exhibited some specimens of *Glover's Patent Enamel Photographs*. The pictures taken by this process possess the advantage of having a white ground, and yet of being very translucent. They are stated to be more permanent than the ordinary photographs. The process is applicable to the production of painted windows, ornamental lamps, &c. The patentee also proposes the application of his process for manufacturing purposes. He says, "It can be applied to the production of clock and chronometer dials, watch dials, thermometers, barometers, compass faces, and tablets of *every description*, ensuring a degree of accuracy never yet attained by the engraver. They can be produced at less than one-third the cost of the materials at present in use for the above purposes, and far excel in appearance anything ever yet attempted. It cannot be injured by any length of time or atmospheric changes, and can be washed as an ordinary piece of porcelain. Another important consideration in the present invention is, that the printing of the photographs can be carried on by gaslight."

In addition to photographic pictures, there were a number of paintings in water-colour and in oil, which were supplied by Messrs. Vokins, and some beautiful figures, vases, &c., in porcelain, supplied by Mr. Sharpus.

The Master of the Mint contributed a case containing a complete collection of the war medals, the counterpart of one which was recently fitted up for her Majesty.

Among the apparatus exhibited, we may mention Knight's new soda-water apparatus, which was described in a recent number of this Journal. On the present occasion Mr. Knight had his apparatus in operation, and afforded to hundreds of the visitors a practical demonstration of the facility with which aërated waters may be made with it, and of the excellence of their quality.

There was a drawing of the new patented apparatus of Dr. Normandy, for the distillation of sea-water, and the production from it of good potable fresh water. This apparatus has been recently fitted up by the Government on the island of Heligoland. Also Normandy's steam-valve for equalizing the pressure of steam, as supplied from the boiler. Messrs. Elliot Brothers supplied some apparatus, including a small model hydraulic press, capable of exerting a pressure of sixty cwt.; Messrs. Horne and Thornthwaite, some sets of educational apparatus, such as are supplied at a very low price for the use of schools;

Mr. Griffin, a double action air-pump on Tait's principle, the barrel being placed horizontally beneath the plate; Mr. Rooff, charcoal and other respirators, and other apparatus; Messrs. Gwynne and Co., a patent barometer, of which the following is a description:—The instrument consists of an inverted glass syphon, sealed at one end and open at the other, partly filled with mercury, and suspended, so that the two limbs of the syphon form the arms of a balance. The invention consists chiefly in supporting or balancing the instrument on points, pivots, or knife-edges, or suspending it by a flexible material, as a silken cord, a fine flexible steel spring, &c., which allows the instrument to vibrate or oscillate freely, and a pointer or hand fixed to the instrument, and moving in front of an index or dial, shows by its motion the most minute change in the atmosphere. Any increase in the pressure of the atmosphere forces the mercury towards the sealed end of the tube, giving a preponderance to that side of the syphon, and, consequently, motion to the instrument; while a decrease in the pressure produces an effect in the opposite direction. A great many varieties in the arrangement of the instrument may be made.

Dr. Hofmann contributed a new form of combustion furnace for organic analysis, in which the heat is produced by the combustion of gas. Several arrangements have from time to time been suggested for this purpose, of which that exhibited on the present occasion is the most recent.

Among chemical and pharmaceutical products, and articles of Materia Medica, claiming notice on the score of novelty or superior quality, were the following:

A specimen of hydride of amyle, a new anæsthetic agent recently introduced by Dr. Simpson, of Edinburgh, from Messrs. T. and H. Smith, of Edinburgh. See page 604.

A specimen of pure benzine or benzole of English manufacture, and a solution of gutta percha in the same, from Mr. Bolton.

A new purple dye, obtained by the oxidation of aniline, together with specimens of silk dyed with it. This is the discovery of Mr. W. H. Perkin, of the Royal College of Chemistry, by whom it has been made the subject of a patent.

Paraffine candles, made from Irish peat, from Messrs. J. C. and J. Field.

Specimen of vanilla from the Mauritius, from M. de Valancé.

Chinese green dye, prepared from the stems of a species of rhamnus, and recently introduced into France, from Mr. D. Hanbury.

The fruit of St. Ignatius's bean, and a new variety of cassia fistula from South America, from Mr. Morson.

Fine crystals of sulphate of manganese, from Mr. Squire.

A fine specimen of sublimed chloride of chromium, from Mr. Braithwaite.

A specimen of the ordeal nut, and of a tincture of Montcenillier wood, used in Guinea for judicial poisoning, from Dr. J. H. Gladstone.

Specimens of dried plants and ferns were contributed by Mr. Bird; a collection of Australian plants by Mr. Sandford; and two branches of the olive-tree, one from the Mount of Olives and the other from Bethlehem, by Mr. Palmer.

SIXTEENTH ANNIVERSARY OF THE PHARMACEUTICAL SOCIETY.

Wednesday, May 20th.

MR. JACOB BELL, PRESIDENT, IN THE CHAIR.

The President, in commencing the business of the Meeting, said that although there was nothing at the present time connected with the affairs of the Society to cause any great excitement amongst its Members, yet there was now quite as much reason for their taking interest in it, and using their energies in promoting the objects for which it was established, as on any previous occasion. It was true that at the commencement of an institution many difficulties had to be overcome relative to the mode of carrying out its objects, which gave rise to discussion and probably disagreements, causing much excitement among its Members, which might be compared to laying the foundation of a house where rocks and other obstructions required to be cleared away before building the walls of the edifice;

but when that was overcome, instead of expending their energies in disputes and arguments, they had an opportunity of bestowing them on the objects for which the Society was established. All were unanimous as to the advantages of associating themselves together for their mutual improvement, benefit, and protection, as well as for the protection of the public, and there could be no doubt as to the policy of keeping their shoulders to the wheel so as to take advantage of their past labours, and by a perseverance in the same course to overcome future difficulties. On looking over what had transpired during the past sixteen years, it appeared to him that they might gain some useful information for their future guidance. It was quite true that the Society was not precisely the institution first aimed at, because they originally contemplated obtaining some exclusive powers from Parliament, such as prohibiting all persons but Pharmaceutical Chemists from opening shops as Chemists and Druggists. To expect this to take place in their own time was probably expecting too much, as the ground on which they could deserve exclusive privileges must rest on qualifications which many of their body did not possess, and it was, therefore, necessary that a probationary period should exist, during their transition from their present state to that of a recognized, educated, and properly qualified profession. A very obvious preliminary step to be taken was to obtain the recognition of the Legislature, in the form of an honorary distinction; and having obtained this, it depended on themselves to substantiate their claim to further confidence, and an enlargement of the benefits which it was hoped would ultimately result to the profession and the public from the establishment of the Society. He often heard it asked, "*qui bono?*"—what advantages resulted from becoming Members of this Association; and his answer was, that the public were beginning to understand that a Pharmaceutical Chemist was more to be depended on than an ordinary Chemist and Druggist, and that consequently those who were Members of the Society were more likely to enjoy the confidence of the public and be patronised by them than non-members. Many young men appeared to be aware of this fact, and they took pains to qualify themselves to pass an examination, and in future none would be admitted to Membership but those who had qualified themselves accordingly. By that means they would attain indirectly that benefit for the public and their own professional character which they had been endeavouring to obtain by more direct means. To induce persons to undergo a voluntary examination it was necessary to make it as honourable a distinction as it could be; but it would have been improper and impolitic, in the first instance, to throw difficulties in the way of it by making it a very formidable ordeal. He was happy to say that the opportunities for qualifying had greatly increased, and the means of education now existed to any extent that pupils desired through the medium of this and other institutions. It had been suggested that the examinations in future might be made more complete by increasing the facilities for the practical part—such as dispensing prescriptions, spreading plaisters, and the other duties of the shop. These examinations had not hitherto, in this country, been carried out to the full extent, and consequently the objection occasionally made against them, that they were rather theoretical than practical, had been urged with some reason, from young men who had been able to answer chemical questions satisfactorily being found deficient in some of the manipulations behind the counter. The experiment, as far as it had been tried, led the Board to believe that these defects might easily be overcome, and that by making the examinations more complete and more practical the distinction would be considered more honourable, and this would increase the desire of young men to come up and obtain the diploma. He hoped the time would arrive when the examination would be conducted publicly in this country as in France, and the Members would thereby have an opportunity of judging for themselves as to the efficiency of the proceedings. In looking over the events that had occurred since the establishment of the Society, he had been constantly reminded of the great services of their late Secretary. He and Mr. Smith, with many zealous founders of the Society, had worked together even before its existence to devise some constitution for it, and to reduce its elements into a tangible form. It was impossible to overrate the zeal and energy which Mr. Smith had thrown into the work, and as the Society increased, his exertions and experience had grown with it, so that no one connected with the Institution was so conversant with the business as Mr. Smith. The Council were not conscious of the full value of his services until he was suddenly incapacitated by illness. It was only when they lost a valuable officer that they became fully aware of his worth, and the Council had found considerable difficulty, from the correspondence and other work being in arrears consequent on his retirement. He (the President) took that opportunity of expressing regret at the delay and disappointment that must have occurred to some Members from the fact of the business of the Society having fallen into some unavoidable confusion during the interval following Mr. Smith's illness until the appointment of his successor. The Council were now getting the work into order, and by the efforts of their present Secretary they hoped soon to overcome the difficulty which the sudden loss of an officer who had grown with the Society had occasioned. He regretted that during the time of the greatest difficulties he was confined to his house by illness, which prevented his doing what he otherwise would, but, by the aid of Mr. Bird, who attended to the financial duties of the Society, and also the assistance of other Members of the Council, he hoped that the interests of the Society had not materially suffered during the interregnum to which he had alluded. He had only further to mention, that after the Report of the Council had been read, he would be happy to hear any suggestions Members might have to make. That was the only opportunity the Members had in the course of the year of meeting together to express in a public manner their approval or disapproval of the way in which the business of the Society had been conducted, and he wished them to take advantage of it. It sometimes happened that a fresh eye detected defects that might not have occurred to those who had gone in the beaten track of the past year. Whatever suggestions might be made by the Members would be received by the Council in the spirit in which they would be offered, viz., for the benefit of the Institution. The Chairman then called upon

The Secretary (Mr. Bremridge) to read the

REPORT OF THE COUNCIL.

FINANCIAL STATEMENT—*From January 1st to December 31st*, 1856.

RECEIPTS.				£	s.	d.
Balance in Treasurer's Hands				333	2	0
5 Life Members' Fees	47	5	0			
Interest	33	13	10			
				80	18	10
Benevolent Fund:						
Subscriptions	46	6	0			
Interest	131	3	6			
				177	9	6
Government Securities, Interest				173	6	10
385 Town Members' Subscriptions	404	5	0			
1777 Country Members	1860	12	0			
274 Associates	143	17	0			
226 Apprentices	118	13	0			
				2527	7	0
Fees:						
15 Pharmaceutical Chemists	94	10	0			
26 Assistants	128	2	0			
64 Apprentices	144	18	0			
				367	10	0
Arrears of Subscriptions				97	16	6
Lecture Fees				22	1	0
Sale of Journals				4	14	6
Balance of Petty Cash due to Secretary				2	9	10
				£3786	16	0

EXPENDITURE.				£	s.	d.
Life Members' Fund Investment				117	13	10
Benevolent Fund:						
Investment	111	7	9			
Gratuities	26	0	0			
				137	7	9
Invested in Government Securities				300	0	0
Repayments				0	10	6
Conversazione, Pharmaceutical Meetings, &c.				42	19	9
House Expenses				35	18	8
Rent, Rates, and Taxes				297	15	6
Fixtures and Fittings				10	2	0
Apparatus				63	13	6
Postages				61	10	2
Stationery				13	2	3
Advertisements				15	7	0
Printing and Engraving				99	1	9
Collector's Commission				29	11	3
Board of Examiners				33	12	0
Expenses of Society in Scotland				57	13	10
Travelling Expenses, Country Members of Council				87	18	11
Salaries				300	0	0
Wages				169	0	0
Journals				662	10	0
Delivery of Journals				181	12	3
Library				19	5	0
Professor of Materia Medica and Botany, including duties as Curator in his department, and payment of Assistant				187	10	0
Professor of Chemistry and Pharmacy, including duties as Curator in his department, and payment of Assistant				225	0	0
Subscription to Royal Botanical Gardens				21	0	0
Solicitors' Costs				5	12	6
Balance in Treasurer's hands				504	16	0
" in Secretary's ditto	107	2	1			
Less Post-office Order out of date	0	10	6			
				106	11	7
				£3786	16	0

We, the undersigned Auditors, have examined the accounts of the PHARMACEUTICAL SOCIETY, and find them correct, agreeably with the foregoing Statement, and that, as shown by the books of the Society, there was standing in the names of the Trustees of the Society, at the Bank of England, on the 31st of December, 1856:

	£	s.	d.
On account of the General Fund ....New 3 per Cents.	6345	4	8
Benevolent Fund......3 per Cent. Consols ...	4801	1	1
Life Members' Fund, 3 per Cent. Consols ...	1325	18	7
And at that date there was due to the Life Members' Fund......	10	10	0

GEORGE S. PEDLER,
JOHN CARR,
WILLIAM BOWER,
ADOLPHUS FREDERICK HASELDEN,
ARTHUR BOWDLER HILL,
} *Auditors.*

3rd February, 1857.

Correct—S. T. COOPER, *Accountant.*

The foregoing Statement shows an excess of income over expenditure amounting to nearly £700; £417 13*s.* 10*d.* having been invested in Government securities, and the balance in the hands of the Treasurer and Secretary being larger by £274 15*s.* 9*d.* than it was at the end of the previous year. To ensure the permanent efficiency of the Society, it is necessary that a portion of the income should be regularly added to capital to compensate for the diminution which will result from the commutation of annual subscriptions of one guinea into fees and life subscriptions amounting to fifteen guineas, the interest of which latter sum payable by future Members, being about half the amount of the subscription which is annually paid by those who joined the Society prior to the date of the Act. It is also important that a fund should be raised for the purchase or erection of a permanent freehold building, better adapted to the requirements of the Society than the present house, which is held on lease for a limited term. The Members will observe with pleasure that the legal expenses are unimportant, as the duty of enforcing the Pharmacy Act is not attended with much expense.

Although the privileges conferred by the Act have been undervalued by some persons, the Council believe that the distinction is becoming more generally understood by the public, and that the confidence founded on that distinction will be found productive of substantial advantage to those who are registered as Pharmaceutical Chemists. With a view of promoting this object, and making generally known the nature and constitution of the Society and its prospective influence on the public welfare, the Council issued towards the end of last year a statement containing a brief notice of the origin and progress of the Society, and the mode in which it is calculated to raise the qualification of dispensers of medicine. This statement, which appeared in the November number of the Transactions, was published entire, or in substance, in most of the metropolitan and many local journals, with editorial comments generally satisfactory and encouraging. The increasing attention which has of late been given to the subject of adulteration both in food and medicines, and the notoriety of occasional accidents arising from ignorance, have tended to strengthen the hands of the Society as an institution established for the express purpose of correcting these deficiencies, and depending to a great extent on public favour for its success.

The growing demand for improved pharmaceutical qualification is shown by the regular influx of students at the School of Pharmacy in London, and in some other places where facilities exist for the study of Chemistry and the allied sciences. The lectures which are provided by the Society, and to which Members, Associates, and Registered Apprentices are admitted FREE, have been better attended during the present session than they have for many years past. An increase has also taken place in the number of pupils who have entered to the course of practical instruction in the Laboratory, and it is satisfactory to observe that this class has been steadily increasing during the last three years.

Since the session 1853-4, when the number of pupils in the laboratory was only twenty-one, the numbers in the three succeeding sessions have been respectively thirty, thirty-two, and thirty-eight. The last number relates to the present session, and represents the entries up to this time. The number of candidates who have passed the several examinations of the Society since the last anniversary, is as follows:—

The Classical Examination	79	Last year	59
The Minor Examination	41	"	46
The Major Examination	27	"	15

The Council have observed with much satisfaction the favourable progress of the Society in Scotland, a report of which appeared in the last number of the Journal. It is also gratifying to find that the local associations in Liverpool and elsewhere are in a thriving state, and are assisting the efforts of the Pharmaceutical Society in promoting education.

The Pharmacopœia Committee has continued during the past year to meet regularly, and has collected some practical information with reference to the Materia Medica. The several classes of preparations are under consideration *seriatim*, with a view of suggesting such amendments as experience may show to be desirable. In the draft of a Medical Bill recently introduced into Parliament, a provision was inserted for removing the duty of compiling the Pharmacopœia from the College of Physicians, and entrusting it to the "Medical Council of Health" proposed to be constituted under the Act, an arrangement to which the Council believe no objection is entertained by the College. The change, however, would not supersede the measures now in progress for an effectual revision and amendment of the Pharmacopœia, as the duty would in all probability continue in the same hands, although nominally placed under a different jurisdiction. Under any circumstances, the practical experience of the pharmaceutist is required in completing the details of this work, and the Society having been officially in communication with the College of Physicians on the subject, cannot escape from a share of the responsibility.

It is with feelings of sincere regret that the Council refer to the serious indisposition of the late Secretary, George Walter Smith, which has deprived the Society of the valuable services of a faithful, zealous, and efficient officer. The active exertions and energy of Mr. Smith at the time the Society was founded, contributed greatly to the success of the undertaking, and his methodical habits of business, regular attention to his duties, and the identification of himself with the welfare of the Institution from its establishment until the state of his health obliged him to retire, entitle him to the esteem and gratitude of the Members. There is every reason to believe that his over-exertion and anxiety on behalf of the Society occasioned a premature breaking-up of his constitution, and the Council consider that some substantial and permanent acknowledgment is due to him for this faithful service.

Mr. Peacock moved that the Report be received, and printed in the Transactions of the Society. He congratulated the Members on the progressive state of the Society, and observed that they had only to be true to themselves, and they would become as important a Society as any in the kingdom. He regreted to find that during the past year the Chemists had been attacked by the Medical Profession more than at any other period, and the occasions selected had been at inquests on the bodies of persons who had died from poison. Before the Medical Profession cried down the Chemists for selling poisons, he thought they should define them, and that the Legislature should name what should, and what should not, be sold without a medical certificate. The Chemists wished to be friends with the Medical Profession, and it was to be regretted that the latter attacked them without cause. He took leave to quote from an old number of the *Morning Advertiser* extracts from a letter on the subject, evidently intended as a defence of Chemists and Druggists, and as a general reply to the censures of Mr. Wakley and others, in reference to various accidents which had led to coroners' inquests. Much of the matter was quite irrelevant, and the Meeting becoming very impatient at so much time being occupied by remarks of that nature from an anonymous newspaper correspondent, and on the speaker declaiming, "I could a tale unfold,"

Mr. Waugh rose to order. He appealed to Mr. Peacock to have some consideration for the patience of the Meeting, having had ample time to unfold his tale. (He hoped Mr. Peacock would excuse the pun.) The Meeting had for a long time listened very patiently, but really the matter which had been introduced, and the personalities respecting the Medical Profession were so entirely foreign to the purpose for which they had met, that he hoped, for the credit of the Society, that these remarks would not be reported.

The Meeting appearing to concur in Mr. Waugh's observation, Mr. Peacock brought these remarks to a close. He inquired whether the Society had a paid librarian.

The Chairman said that the duties of librarian were combined with those of other officers. There was always some person who performed the duties, but no officer under the distinct designation of librarian.

Mr. Gibbs seconded the motion.

Mr. Collins said that the country Chemists found the Medical Profession their best friends. They were always ready to place confidence in the integrity of the Chemists, and he was not aware that they had been so severe as Mr. Peacock had stated.

Mr. Slipper said that he found by conducting his business so as not to tread on the heels of the Medical Profession, he obtained their approbation as well as that of the public. He repeated his suggestion of last year, that the Report of the Council should be printed, and circulated amongst the Members previously to the day of meeting, as was done by other public institutions. It was impossible for Members, from hearing the Report read, to retain the various points it touched on so as to be able to sift and ascertain if there were anything that required particular attention, or that was objectionable. He thought it practicable in these days of steam-printing that the Report might be in the hands of Members at least one week before the day of meeting. He considered it worth the attention of Members whether it should not be a *sine quâ non* that the Apprentices of Members should become registered Apprentices in connexion with the Society. He mentioned the subject from a belief that many Pharmaceutical Chemists, especially those in the country, took Apprentices without impressing on parents the necessity of their children becoming registered Apprentices. He concurred in the necessity of their making the examination practical as well as theoretical. In some of the hospitals it was found that those students who were best up in theory were the worst operators, and so it was sometimes with Chemists.

Mr. Burden thought some allusion would have been made in the Report to the intention of Parliament to interfere with the sale of poisons, and he called attention to Lord Campbell's recent remarks in the House of Lords relative to the necessity of some legislative enactment to curb the free-trade in these drugs. The Chemists had no wish to poison their neighbours, but he thought great difficulty must attend such legislation as that proposed, because it was well known that persons who destroyed themselves by poison contrived to obtain it for some professed legitimate object. It would be almost impossible for Chemists to take an attestation for every pennyworth of laudanum they sold; and he considered it was desirable that the Council of the Society should watch the matter, and if necessary interfere, so as to endeavour to modify any very stringent enactment that might be proposed relative to this subject.

The Chairman said it did not follow because the Council had not noticed the subject in the Report, that therefore they had paid no attention to it. He assured the Meeting, that should any such measure as that referred to be introduced into Parliament, it would be the duty of the Council fully to consider it, and give them due notice respecting its details, and, if needful, to call a Special Meeting. He had reason to believe that some legislation was intended on the subject, and whenever the draft of the bill was submitted to Parliament, it would receive the serious attention of the Council, and be communicated to the Members.

Mr. Peacock rose to explain some of his previous remarks, and disclaimed any intention of attacking the Medical Profession.

Mr. Collins hoped it was not the intention of the Council, as the Report appeared to indicate, to go on in the same hopeless spirit as in times past. He thought, as there were several measures before Parliament relative to the medical profession, it was a good opportunity for the Council to endeavour to obtain the introduction of a clause into them beneficial to the Pharmaceutical Chemists. Whenever legislation took place in reference to the trade, it would be necessary to include all at the time in the profession, and the sooner they commenced, he thought, the better. It would be as well to correspond with the Medical Corporations on the subject, and in the event of their consenting to support the claim of the Pharmaceutical Chemists, they in return might be able to render them assistance, by the influence they might be able to bring on various Members of Parliament. He thought the object of the Society should be first to protect its Members, and then endeavour to induce Medical Practitioners to abandon Pharmacy. He moved, "That in the opinion of this meeting the influence of the Pharmaceutical Chemists of Great Britain would be wisely exercised in supporting the claims of Medical Practitioners to a legal recognition of their right to remuneration for professional service, and that the Council be respectfully requested to take such steps as in their judgment may best promote this object. That the Council be further requested to place themselves in communication with the Medical Corporations, with the view of obtaining their concurrence to the introduction of clauses in the Medical Bill, introduced to Parliament under their auspices, prohibiting the retail sale or compounding of medicines by any other persons than qualified Apothecaries or Pharmaceutical Chemists."

The CHAIRMAN stated that, having one Resolution before the Meeting, he could not take a second, unless as an amendment.

Mr. COLLINS therefore deferred his motion.

Mr. WAUGH, on the part of the Council, said that it was intended the Report should be printed, so that a copy of it might have been put into the hands of every Member who entered the room that morning, but owing to some mistake it had not been done. He thought that, under all the circumstances, that would be the earliest period at which the Report could be circulated.

Mr. MASON also expressed an opinion that it was desirable that the Members should have an opportunity of reading the Report before they were called upon to approve of it. He regretted the loss of their late Secretary, and he considered that his services should be recognized by a resolution of the body. They had all received the utmost courtesy and kindness at Mr. Smith's hands. He called attention to the cost of the delivery of the Journals of the Society, which he said had increased during the past five years, whilst the number of Members had decreased during that time. He at first considered the difference arose from their being sent by post, but he found on calculating it that even then the expense ought not to have exceeded £133, so that there was a difference of £50, which he could not understand. He called attention to the late delivery of the Journal. He did not get his till the second of the month, though a country friend of his received a copy on the 31st.

(It was explained that the increase in the expense of the delivery arose from the endeavour from time to time to ensure greater punctuality, that a part of the expense was formerly included in the salary of the Secretary, and that in sending the Journals by post, other expenses besides postage were incurred.)

Mr. DICKINSON suggested that the Report should be published at least a month before the day of Meeting.

The CHAIRMAN said it would be impossible. It was often found that up to the day of meeting some addition or amendment was necessary.

Mr. GARLE observed that, as an improvement in the examination had been alluded to, he thought it desirable that the Board should give a first and second class certificate, which is the custom of some other examining bodies.

Mr. BOTTLE, after urging the necessity of an early circulation of the Report, regretted that it omitted all allusion to the four medical bills now before Parliament, in one of which there was a clause affecting the privileges of Chemists and Druggists. He thought it desirable that the Report should be circulated with the voting papers. He objected to the names of Candidates for the Council being introduced into the leading articles of the Journal, and asked in what relation that publication stood to the Society—whether it belonged to the Society or to the Editor. The remarks about the Country Members of Council were quite insulting. He thought it very desirable that Country Members should be elected on the Council; and he expressed an opinion that some alteration in the management of the Society was necessary, to give new life to it. He spoke of the Members of the Medical Profession as the best friends of the trade. The Country Chemists most suffered from the huxters, and not from medical men supplying their own medicines. He was disappointed at not hearing the opinion of the Council expressed in the Report relative to the sale of poisons. If the Council wished to continue to receive the support of the Country Members, who stood now on the list as 6 to 1, they must do something towards protecting them from the infringements of the trade by grocers, who took away the bulk of the business. The words "Pharmaceutical Chemist" might do in London, but were not a sufficient protection in the Country. He complained of the omission in the accounts of a sum for prizes to students, and he objected to the large cash balance stated in the Report to be in the hands of the Secretary.

Mr. BIRD explained that it arose from the illness of the late Secretary.

Mr. PEDLER bore testimony to the great accuracy with which the accounts of the late Secretary were kept. He urged on the Members the necessity of their being united, if they wished to obtain the advantages for which the Society was originally established. He thought there was good ground on the part of the public for being alarmed at the dispensing of poisons. The most effectual way to remove it was to raise the status of the profession.

The CHAIRMAN, in reference to the remarks on the leading article of the Journal alluded to, said that he thought Members knew that the leading articles did not form any portion of the Transactions of the Society. The reason for mentioning the gentleman's name was, that he was one of the oldest Members, and had been slighted in being passed over on former occasions. It was his opinion that the attendance of country Members two, three, or four times a year at the Council Meetings was as much as could be expected of them, and the Members should recollect that the attendance of each every time involved a considerable expense. Some of the Meetings were merely routine Meetings, and the attendance of country Members might, on those occasions, be less important. The orders of the day were invariably sent to them, so that they might attend when subjects of importance required their presence.

After a desultory conversation, in which Messrs. Macfarlane, Hollier, Moore, Hooper, Bird, Edwards, Waugh, and Woolley took part, the resolution for the reception, &c., of the Report was unanimously agreed to.

Mr. COLLINS then moved his resolution, which was seconded by Mr. DICKINSON.

It gave rise to a protracted discussion, in the course of which there appeared to be a general feeling that it was undesirable to adopt such a resolution, and that the object aimed at might be better attained by leaving it to the Council. Ultimately the resolution was withdrawn, and the following substituted and carried *nem. con.*:—

"That this Meeting is of opinion that the Council should, during the ensuing year, watch Medical Legislation, with a view to protect the interests of Pharmaceutical Chemists."

Mr. BOTTLE moved—"That the annual Report be printed, and circulated with the voting papers."

The resolution, having been seconded, was put to the Meeting, and negatived.

The CHAIRMAN stated that he had in his hand a letter from a Member who was not able to attend (Mr. Tuff, of Enfield), who desired to call the attention of the Meeting to three subjects:—1st, The unfair operation of the Patent Medicine Licence; 2nd, The sale of medicines, poisons, &c., by grocers and others; 3rd, The propriety of claiming for Pharmaceutical Chemists exemption from serving on juries, when the public health might suffer from their absence. One of these subjects had been already discussed, the others must be reserved for a future opportunity, the time having expired.

Mr. PEDLER proposed, and Mr. BOTTLE seconded, a vote of thanks to the retiring Council, which was carried.

Twelve Scrutineers having been appointed, and thanks voted to the Chairman, the Meeting adjourned until Friday, the 22nd instant, at eleven o'clock.

ADJOURNED MEETING,

22nd May, 1857.

MR. JACOB BELL IN THE CHAIR.

Mr. CONSTANCE, the Chairman of the Scrutineers, presented the following Report:

We, the Scrutineers appointed at the Sixteenth Annual General Meeting of the Pharmaceutical Society of Great Britain, do hereby certify that we have duly examined the voting papers committed to us, and report the following results:—

COUNCIL.

Voting Papers allowed	822
" disallowed for informality	13
	835

Ballard..	548	Edwards	745	Morson	785	Squire..........	684
Bird	737	Herring	442	Moore	521	Smeeton	482
Bucklee........	729	Lea	446	Meggeson	677	Sandford	624
Davenport ...	725	Macfarlane ...	768	Peacock	536	Woolley........	681
Deane	781						

AUDITORS.

Voting Papers allowed	785
" disallowed for informality	33
	818

Barnes.........	399	Carr	600	Hill	636	Pedler	601
Bower	515	Haselden......	664	Palmer.........	432		

(Signed) EDWARD CONSTANCE, *Chairman*
W. K. HOPKIN
WILLIAM WINDLE
JOHN T. FENN
NATHANIEL B. GIBBS
THOMAS WILLIAMS
JOSEPH KETTLE
JOHN BARNARD
CHARLES COLES
W. H. BELL
GEORGE GALLIERS
JOHN T. TUPHOLME

The CHAIRMAN declared the COUNCIL and AUDITORS for the ensuing twelve months to consist of the following Members:—

COUNCIL.

BALLARD, EDWIN, Farringdon, Berks
BELL, JACOB, 338, Oxford Street
BIRD, WILLIAM LIONEL, 42, Castle Street, Oxford Street
BREW, THOMAS A., 71, East Street, Brighton
BUCKLEE, WILLIAM HENRY, 86, New Bond Street
DAVENPORT, JOHN THISTLEWOOD, 33, Great Russell St., Bloomsbury
DEANE, HENRY, Clapham
EDWARDS, JOHN B., 42, Berry Street, Liverpool
EDWARDS, GEORGE, Dartford
HANBURY, DANIEL BELL, Plough Court, Lombard Street
KEELING, GEORGE R., High Street, Epsom
MACFARLANE, JOHN F., 17, North Bridge, Edinburgh
MORSON, THOMAS N. R., 19, Southampton Row
MEGGESON, GEORGE, 64, Cannon Street, City
MOORE, JAMES LODGE, Craven Place, Paddington
PEACOCK, HAMERTON R., 170, High Street, Poplar
SANDFORD, GEORGE WEBB, 47, Piccadilly
SMITH, NATHANIEL, High Street, Cheltenham
SQUIRE, PETER, 277, Oxford Street
WAUGH, GEORGE, 177, Regent Street
WOOLLEY, JAMES, 69, Market Street, Manchester

AUDITORS.

BOWER, WILLIAM, 96, Tottenham Court Road
CARR, JOHN, 171, High Holborn
HASELDEN, ADOLPHUS F., 18, Conduit Street
HILL, ARTHUR, 11, Little Britain
PEDLER, GEORGE S., 199, Fleet Street

In answer to a question respecting the informalities referred to in the rejected votes, the Scrutineers stated that in some voting papers more than the proper number of names were left. Some of the Country Members had omitted to identify the envelope with name and address, as required by the bye-laws, and the votes of some London Members having been sent by post, could not be received.

The CHAIRMAN stated that, since the meeting on Wednesday, the substance of a proposed Bill for regulating the sale of poisons had been published, and copies of the Bill would in the course of the day be sent to the Members of the Council. It was obviously impossible that such a Bill should pass, and it would be necessary for the Council to watch its progress.

The two Medical Bills were on the table, but the Chairman thought it needless at the present time to trouble the Members with any detailed remarks on the subject. The two Bills would tend to militate against each other, but neither of them appeared materially to affect the interests of Pharmaceutical Chemists.

Mr. **Bucklee** moved, and Mr. **Bird** seconded, a vote of thanks to the Scrutineers, which, having been carried unanimously, was acknowledged by Mr. Constance.

PHYTOLOGICAL CLUB.

17, *Bloomsbury Square, May* 13*th*, 1857.

ROBERT BENTLEY, F.L.S., PRESIDENT, IN THE CHAIR.

Donations of plants were announced from Mr. Ereaut, of Jersey, Mr. Medley, of Worcester, and Mr. Groves, of Weymouth.

An account of a botanical excursion to Lulworth, near Weymouth, by Mr. H. Groves, was then read, and illustrated by specimens.

The Committee have arranged that the botanical excursion shall take place on Saturday, the 27th of June. They propose that the Members should assemble at the Waterloo station and proceed by rail to Putney, from which place they would go across Wimbledon Common to Richmond. Any one wishing to join the excursion should communicate with the Secretary, Mr. C. Wood, 17, Bloomsbury Square.

As some of the Members wish to dine at Richmond, any Member desirous of joining the dinner should indicate the same to the Secretary before the 20th of June.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Thursday, 23*rd April,* 1857.

MR. ABRAHAM, THE PRESIDENT, IN THE CHAIR.

Mr. B. Townson was elected a Member, and Mr. Booker an Associate of the Society.

The **Secretary** announced donations to the Library and Museum from Messrs. W. J. Blackburn, J. H. and S. Johnson, J. F. Grimsdale, A. Redford, T. D. Walker, H. S. Evans, J. Southward, the Royal Institution, and himself.

The **Chairman** then intimated that the next business was that which was announced in the circular:—

A REPORT ON THE GENERAL PROPERTIES OF THE RIVINGTON WATER.

BY J. B. NEVINS, M.D., AND J. B. EDWARDS, PH.D.

This was a subject of great interest, and immediate practical importance. It was one on which they ought to be able to afford useful information to their fellow-townsmen. It had been before discussed amongst them, and no doubt it would be again discussed with that philosophic calmness which distinguished their former debate. It had excited strong expressions; but he hoped on this occasion nothing that could give rise to unpleasant feeling would be indulged in, and that they should proceed, and be actuated by a love of truth. The two gentlemen who had prepared the report had paid very great attention to the subject; they had studied it laboriously, and no doubt would be able to give a good reason for all they stated.

Dr. **Edwards** then proceeded to read the report of the evening, an elaborate and lengthy document. He said that on the 15th of January last Mr. Mercer brought before the Members of the Chemists' Association specimens of the Rivington water, in small quantity, obtained by Mr. Alderman Bennett, and gave the result of a general chemical examination of the water, dwelling specially upon its action as a solvent upon metallic lead, and on the decomposition which he anticipated would result from long storing on sea voyages, in consequence of the organic matter. These statements, and the comments made upon them, caused much anxiety in the public mind as to the wholesomeness of the supply which the subsequent pro-Pike and anti-Pike discussions by no means tended to allay. A proposal was therefore made to submit the water to certain eminent chemists in different localities, for scientific examination and report; but the expense of bringing such judges to the spot, and of employing them upon a long and elaborate inquiry, negatived the proposition. It then occurred to himself and Dr. Nevins that it became a public duty to come forward, and do to the best of their ability what was necessary to relieve the public mind on this subject, trusting that their offices would be accepted in good faith, their only desire being to serve the public. Acting, therefore, under a sense of this responsibility, they had endeavoured to steer clear from party bias, and to entertain this as a purely scientific question.

1st. Is the Rivington water in a condition fit for human consumption?

2ndly. If not, can it by any available means be made pure and wholesome?

Having obtained water from the various reservoirs at Rivington, from Prescot, and well-water from Green Lane, the authors proceeded to make their experiments. The quantity of water operated upon had been about twenty gallons, and had included, on several points, the present town supply, as well as various admixtures of the well-water with the Rivington in very various proportions. Having repeated the results of the experiments upon lead, as read before the Literary and Philosophical Society, Dr. Edwards went on to observe that the next experiments were made with a view to ascertain the keeping qualities of the water, and then noticed the colouring matter found in the Pike water. He said that publicity had recently been given in the Liverpool papers to experiments in the direction of galvanic action with a view to removing the colour, by Dr. Medlock, of London, and the results obtained by that gentleman had been adduced as applicable to the decolorization of the Rivington water. The process consisted simply of suspending a coil of iron wire in a reservoir of the Thames water. But surely it would be remembered that the Rivington water was in contact with iron by its line of pipes for twenty-five miles; and if so simple an agent was to decolorize it, we should already obtain it in this condition in the present reservoir. The organic matter in Thames water, it must be remembered, is largely of animal origin, hence the compound of nitrogen, viz., ammonia and nitrous acid which result from its decomposition. In the present instance the organic matter is purely vegetable in its origin; the theory and practice of Dr. Medlock did not, therefore, apply. Decolorization by means of animal charcoal was objected to on the ground of expense; but the reburning of animal charcoal by simple apparatus was now so readily applied, and so generally used, that the expense would not be large after the first outlay, while the character of the water would be greatly improved. It had lately been observed of the town supply of water that it was much harder than when the Rivington supply was first introduced, and that it now possessed neither the advantages of the well-water nor those qualities peculiar to the Rivington water. The authors had observed this change, and attributed it to an ineffectual attempt to decolorize the water by means of quicklime, which, while only partially successful in removing the colouring matter, materially increased the hardness of the water, and for many purposes injured its character. The authors entertained little doubt that, if experiments were instituted upon a sufficiently large scale, the colour might be effectually removed, without in the slightest degree injuring the best quality of water, namely, its softness. The authors concluded their paper thus:—The general conclusions to which we have arrived, as a result of these experiments, may be thus briefly stated.

1st. That the Rivington water, or any mixture containing it in equal proportions or thereabouts, will, when stored for twenty-four hours in a leaden cistern or tank, dissolve lead. Water thus impregnated is dangerous to the public health; and it is therefore necessary that, whenever leaden cisterns are employed, the metal should be protected by paint or some suitable cement. No danger results from the mere passage of the water through short lengths of leaden pipes.

2nd. That the Rivington water contains less germinating matter than the well-water from Green Lane, and when stored in either close or open vessels has preserved its sweetness during the six weeks over which our experiments have extended. Mixtures of Green Lane and Rivington water do not remain sweet for a lengthened period.

3rd. That the colouring matter may be, and ought to be, removed; and that, when thus properly filtered, the Rivington water is a wholesome and very excellent beverage, and calculated to be a great boon to the community.

4th. That the small amount of mineral ingredients it contains are of the most valuable character for dietetic and manufacturing purposes; and that the objectionable colour being removed, it has properties superior to well-water. Its insipidity is but the result of its purity and of the small proportion of carbonic acid which it contains. While, then, as a matter of taste and luxury, it may be desirable to retain a limited supply of well-water for the benefit of those who prefer it, the general public will be best served by a speedy and abundant supply from Rivington, free from any admixture whatever; and the question of a separate supply should be ascertained as one of public convenience rather than as one affecting the public health.

Dr. Nevins stated that he had had considerable correspondence with medical men in those districts supplied with water of a similar description to that from Rivington. The towns to which he referred were Kendal, Lancaster, Bolton, and Sheffield. In Kendal, the report was, that for about two months, during the heat of summer, the water was so offensive that the people had to resort to the wells; but that the health of the town had improved since the supply of surface water, and that cases of lead poison were unknown. The reports which he had received from the other three towns were very similar; and so far as England was concerned, in regard to the effect on the health of the people, the answer was decidedly favourable.

The reading of the paper and Dr. Nevins's remarks were followed by considerable discussion, in which the Chairman, Mr. Mercer, Alderman Bennett, Dr. Collins, Mr. Mackinlay, and others, joined.

Thursday, 7th May, 1857.

THE PRESIDENT, MR. ABRAHAM, IN THE CHAIR.

Mr. John Glover, of Birkenhead, was elected a member.

The Secretary announced donations to the library from Mr. W. Wright and Mr. W. H. Samuel.

The Chairman called attention to a letter of Dr. Medlock, referring to the paper read by Drs. Edwards and Nevins at the last meeting.

Dr. Edwards said, that the question at issue was, could the colouring matter in the Rivington water be removed by means of iron? He had found that iron had some effect in destroying the vitality of the vegetable matter in the Rivington water, but does not remove it from solution, because, when heated, the water became more highly coloured than before, in consequence of the decomposition of the organic matter present.

Mr. G. R. Berry then read the following paper:—

DRY COLLODION PROCESSES.

In the investigation of the dry collodion processes I propose to glance, first at the ordinary wet process, its manipulations and the chemical changes involved, and then to detail the different methods by which various experimenters have endeavoured to produce a dry collodion process, and at the outset I would mention that the more the whole subject of photography is investigated, the more palpable is the evidence that the ordinary laws of chemistry are capable of explaining all the phenomena observed in the different photographic processes, albeit our new science has revealed to us subtile chemical changes which our ordinary tests have failed to appreciate, illustrations of which will arise in the course of our subject this evening.

We will take first the ordinary collodion process, which is thus divided:

1. Preparation of the collodion.
2. Preparation of the nitrate of silver bath.
3. Preparation of the developing solution—positive and negative.
4. Removal of the surplus chemicals.
5. Varnishing.

Collodion is, as all are aware, a solution of one of the pyroxyline compounds, in a mixture of alcohol and ether, and holding also in solution an iodide, or a mixture of iodide and bromide of potassium, ammonium, cadmium, or other bases. The number of these is not very extensive, as the case will admit only those soluble in the menstruum before mentioned, but if the ingredients are few in number the variations in quantity and relative adjustment are almost infinite, as every photographer has his series of pet fancies, and to this fact nearly all the disheartening failures of amateurs are attributable, and almost every instance of success has been attained by those who, adopting one formula, have adjusted their silver bath and developer in accordance; and, therefore, when the impressions fail to be successful, have only these three items to examine or replace. The silver bath varies in its strength from 20 to 60 grains per oz. of water, and it is on the proper reaction between the collodionized plate and the nitrate of silver in solution all success depends. The most approved formula for the silver bath for the negative and dry processes I believe to be the following:—

Nitrate of silver, that has been fused and probably containing a portion of nitrite . . . . 1oz.

Dissolve in 4oz. water, to which must be added iodide of potassium . . 20grs.

This mixture must be well agitated at intervals for one hour. By this means the strong solution of nitrate of silver dissolves a portion of the precipitated iodide, and lets fall another portion on the addition of water to make up 14 fluid oz. The solution is then filtered and is ready for use. The collodion plates used will present an even primrose-coloured surface, without *striæ* or other markings, and the developed impressions will be clear and free from any irregularity of coating. The collodion process negative has, in itself, many advantages. Its great advantage is—exquisite sensibility, inasmuch as under favourable circumstances instantaneous impressions may be obtained; at the same time the delicacy of definition is all that can be desired, and if not equal to albumen, it is the fault in the preparation of the pyroxyline from which the collodion is made. It is facile in manipulation and speedy in its perfected results. Its disadvantage is the necessity of obtaining the impressions in the camera in the first few minutes from the excitation of the plate; it is therefore impossible to work far away from the dark closet or the tent in which the plates are prepared and developed. It is this that has prompted experimenters to devise some plan by which the sensitiveness of the plate might be indefinitely prolonged, and I lay before you the various plans proposed, in the order of their publication, as correctly as my means will allow.

If we excite a collodion plate in the usual way, and leave it in the dark slide until dry, we shall find that the nitrate of silver film, as it concentrates by evaporation, dissolves out the iodide from the collodion surface, and eventually crystallizes in minute stellar groups, completely destroying the utility of the surface as a photographic medium. The prevention of this result was the first problem to be solved if the plates were to be preserved any length of time after preparation. At first various plans were tried to prevent the evaporation altogether, as, for instance, laying a second glass plate directly upon the collodionized surface. Thus Messrs. Spiller and Crooks attempted the same object by steeping the prepared plate in a strong solution of a deliquescent nitrate. At first zinc, and subsequently magnesia, were employed. At a later period, Messrs. Shadbolt and Lyte partially washed off the excess of nitrate of silver from the plate, and poured over it a solution of honey, and I do not think there is, even now, a better process extant.

Simple oxymel, glycerine, treacle, and various other substances have also been employed. During this period the somewhat remarkable process of M. Taupenot was published, and was as follows:—The plate was first coated with collodion and sensitized in the usual way, the surface washed, and a mixture of albumen and honey slightly iodized was poured over it; it was then allowed to dry, and again plunged into the silver bath and rinsed, when it might be used, either wet or dry. The theory of the process, at the time it came out, was imperfectly understood; and, as it involved very operose manipulations, it was not so generally used as it deserved. The main point was the coating the excited collodion surface with the albumen, thus filling its pores and preserving it in some measure from the action of the air; and it being ascertained that even if the whole of the free nitrate were removed by washing, and the plate dried in the dark chamber, it was yet sensitive, although in an inferior degree than when recently prepared.

Mr. Barnes, who has been eminently successful upon dry plates, has published a pamphlet on the subject; contemporaneously, Dr. Hill Norris proposed to cover the washed plates with gelatine, and I believe his dried plates preserve their sensibility for many months. I may add that Dr. Norris has patented his process, and that a company has been formed at Birmingham to sell the prepared plates.

Mr. Sparling employed a solution of dextrine mixed with honey, and iodized in the same way as Taupenot, also following him in two immersions in the silver bath.

Mr. Maxwell Lyte has yet more recently advocated the use of what he terms *meta-gelatine*, produced by boiling a solution of gelatine with sulphuric acid until it ceases to gelatinise on cooling, then removing the acid by digestion upon carbonate of lime, filtering, and adding a portion of clarified honey. This is poured over the plate, without previously washing, and stored away until required for use. This is certainly the quickest, and, as far as I have seen it tried, the most satisfactory process, as it may be used indifferently, either wet or dry.

One word more on the peculiarities of the meta-gelatine. While the Taupenot, Norris, and Sparling plates are hard and horny, the meta-gelatine is as it were porous, and to this I attribute the fact of the non-necessity of washing away the free nitrate, and from a series of experiments I have now in progress, I think I may safely say that before long I shall, by a modification, be enabled to dispense with the collodion altogether, and at the same time preserve the rapidity of action. This would, with large-sized plates, be a great pecuniary boon to photographers, as well as obviating the uncertain way in which collodion sets on large surfaces. Of course it is not to be expected that I shall divulge my mode of procedure until I have achieved my object.

The thanks of the meeting were unanimously awarded to Mr. Berry for his valuable paper.

ORIGINAL AND EXTRACTED ARTICLES.

HYDRIDE OF AMYLE.

BY T. AND H. SMITH, EDINBURGH.

In presenting a specimen of the new anæsthetic discovered by Professor Simpson, the hydride of amyle, and which we had the pleasure of preparing for him, it may not be out of place to make a few remarks regarding its history, chemical characters, and physical properties.

le Dr. Frankland, Professor of Chemistry, Owen's College, Manchester, discovered it in the course of an investigation undertaken for another object. It had long been disputed whether ether and alcohol were mere hydrates of olefiant gas,

$$\begin{array}{lccccccl} & \text{Olef. gas.} & & \text{Water.} & & \text{Ether.} & \\ 2\{C_2H_4\} & (C_4\,H_4) & + & \underset{H_2O}{HO} & = & (C_4\,H_5\,O) & C_4H_{10}O \\ & & & & & \text{Alcohol.} & \\ C_2H_4 \cdots & (C_4\,H_4) & + & {}_2HO & = & (C_4\,H_6\,O_2) & C_2H_6O \end{array}$$

or whether they were constituted by the union of a compound radical ethyle $(C_4\,H_5)$ with oxygen $(C_4\,H_5) + O = (C_4\,H_5\,O)$ in the case of ether; alcohol being merely its hydrate $(C_4\,H_5\,O) + HO = (C_4\,H_6\,O_2)$. C_2H_6O

This last view had been advocated strongly by Liebig, although the very existence of organic radicals remained at that time entirely hypothetical; yet Liebig expressed $_2H_5$ his conviction that the ethyle radical $(C_4\,H_5)$ would be obtained in a separate state.

Dr. Frankland, in entering on the interesting and able investigation of which the hydride of amyle was one of the fruits, was influenced by the desire of deciding this question by separating the radicals themselves, and more especially those of the different alcohols and their derivative ethers. The subject was undoubtedly a most difficult one, and required a clear head, profound chemical knowledge, and nice accuracy of manipulation.

Dr. Frankland began with wine alcohol, and unquestionably separated the radical $(C_4\,H_5)$ ethyle, but which existed as a vapour even below the zero of F. He concluded, from the much higher equivalent of amylic alcohol $(C_{10}\,H_{12}\,O_2)$ and the higher density of its vapour, that the radical amyle, if he should succeed in obtaining it, would exist as a liquid at ordinary temperatures, and thus give the means of ascertaining its nature more certainly, and also give a clue to a correct understanding of the character and functions of the compound radicals in general, and more especially of those which exist in the class of bodies called alcohols, on account of the great theoretical and practical interest belonging to them in a chemical point of view.

The method by which Dr. Frankland obtained and proved the existence of amyle, the radical of amylic alcohol, was to heat for several hours in an oil-bath iodide of amyle prepared from pure fusel oil by the simultaneous action of phosphorus and iodine on it,* in sealed glass tubes along with granulated zinc at a heat of 190° C. (374° F.), and then distilling off the products of decomposition. The first two-thirds came off at a heat of about 80° C., and the remaining third at about 160° C. (320° F.). The first distillate on rectification proved to be a liquid boiling at about 55° C. (95° F.), and on acting upon the liquid with anhydrous sulphuric acid, he separated a carbo-hydrogen polymeric with olefiant gas ($C_{10} H_{10}$), and on then distilling the part unacted on by the acid, he obtained a liquid having the composition ($C_{10} H_{12}$), with the very low boiling point of 30° C. or 86° F., which, in place of having an unpleasant odour and tar-like taste as the mixture had, possessed, on the contrary, a grateful fruity odour, and was tasteless.

Pentan
$C_5 H_{12}$
35 °C

This was the hydride of amyle, whose decided and energetic anæsthetic action Dr. Simpson has just discovered.

It is a clear colourless mobile liquid, and is the lightest fluid known, having the very low density of .638 at 57° F., and a vapour density of 2.5. It is very inflammable, and burns with a brilliant white and smokeless flame. It is insoluble in water, but readily soluble in alcohol and ether. It is a very stable compound, resisting the action of fuming sulphuric acid and the most powerful oxydising agents. Its rational formula is ($C_{10} H_{11} + H$), and therefore the hydride or hydruret of the radical amyle.

The liquid that was distilled last from the tube at a high heat proved to be the pure radical, and which had now been got in a separate form for the first time. This liquid is colourless and clear, of a density of .770, and boils at 155° C., or 311° F., and the density of its vapour is 4.9.

$C_{10} H_2$
2,7
dimeth
octan
160

As Dr. Frankland found in his previous investigations for the discovery of the radical of wine alcohol, that on exposing the iodide of ethyle with an equal bulk of water along with zinc in sealed tubes to the action of heat, the only product was the hydride of ethyle, he was led to try the same process with the iodide of amyle, and the result of the use of water in the reaction was exactly analogous. Instead of a mixture of amylene, amyle and its hydride, he now obtained as the only product of decomposition the hydride of amyle, which distilled off at a very low heat, and after digesting the liquid for twenty-four hours with caustic potash, and redistilling at 35° C., or 95° F., was obtained quite pure.

He also found, that by the addition of water to the iodide and zinc, the decomposition easily took place at a heat of 140° C., or 285° F., whilst with the iodide and zinc alone a heat of 190° C. was required, besides the necessity of amalgamating the zinc.

On proceeding to prepare the hydride for Dr. Simpson, we very soon discovered the unsuitableness of sealed tubes, as used by Dr. Frankland, for its preparation in sufficient quantity to test its powers as an anæsthetic. We therefore got much larger tubes made, and carefully annealed, of one inch internal diameter, and $\frac{3}{16}$ of an inch thick; and instead of being sealed, which necessarily involved their destruction at each operation, we had them effectually closed by accurately ground stoppers, and these again strongly fixed down in their places by a metal bridle, with a binding screw. But from the enormous pressure, not less than 300 lbs., or twenty atmospheres, by calculation, to the inch, there was extreme difficulty in getting the stoppers perfectly tight. Seeing, however, superior advantages in this plan over the other, if the stopper could be made tight, we were induced to persevere, and at length, with great care in the grinding, succeeded in making an absolutely tight tube, even under such great pressure.

But from the great risk of explosion with such size tubes, we afterwards gave up the idea of glass ones altogether. One of these, after being exposed to the usual heat with a charge for more than an hour, burst into innumerable fragments with a tremendous explosion, breaking the thermometer and blowing out the sides of the bath, whose scalding contents were scattered about in all directions, but fortunately without doing any personal injury. This occurrence proved the necessity of adopting another plan, and we therefore thought of a copper tube, which idea, however, was nearly put aside, under the fear of a strong galvanic action being induced, and interfering with the desired action; but, on reflection, such a result seemed to be of a favourable nature rather than otherwise, and we have now found that a copper tube answers admirably—and, in fact, part of what we made for Dr. Simpson was prepared in one.

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* The iodide of amyle is a colourless, transparent, heavy liquid; density 1.5. It is not readily decomposed, not changing colour even when kept for a long time in diffused daylight, although the direct rays of the sun decompose it easily. It mixes readily in all proportions with oils and ointments. In consequence of this, and the large quantity of iodine—two-thirds of its weight—which it holds in a perfect state of solution, it seems to us to be worthy of attention as an outward application, and all the more that the iodine is in the most favourable condition for being absorbed.

A key to the explanation of the formation of the hydride of amyle is found in the tendency of the radical amyle to combine, not only with electro-negative, but also with electro-positive elements. Thus there are not only compounds like the following:—

Amyle.		Electro-negative elements.
$(C_{10}H_{11})$	+	O
$(C_{10}H_{11})$	+	Cl
$(C_{10}H_{11})$	+	Br
$(C_{10}H_{11})$	+	I;

but also—

		Electro-positive elements.
$(C_{10}H_{11})$	+	Z
$(C_{10}H_{11})$	+	H

Dr. Frankland succeeded in preparing both zinc methyle, zinc ethyle, and zinc amyle. These have all an intense attraction for oxygen. In the case of zinc methyle, it equals potassium in that respect; a small glass tube, containing only a few drops of the liquid zinc methyle, actually became red-hot on being placed under water, from the great intensity of the chemical action. The zinc ethyle is a liquid of 1.18 density, boiling at 118° C. or 244° F., and having a vapour density of 4.25.

All these metallo-organic bodies have such an attraction for oxygen that the most extraordinary precautions are necessary in preparing and distilling them, both to get quit of every trace of water, and to exclude the presence of air by replacing it either with an atmosphere of hydrogen, nitrogen, or carbonic acid.

The moment one of these metallo-organic compounds comes in contact with moisture, it is decomposed: the zinc takes the oxygen and the radical the hydrogen from an equivalent of water.

One of the methods of analysing it is indeed founded on this character: thus in the case of the amyle compound the action is as follows:—

$$\left.\begin{matrix}(C_{10}H_{11})+Z\\ HO\end{matrix}\right\} = \left\{\begin{matrix}C_{10}H_{11}+H\\ ZO\end{matrix}\right.$$

And the production of hydride of amyle appears to be as here represented:—

$$\left.\begin{matrix}(C_{10}H_{11})+I\\ HO\\ ZZ\end{matrix}\right\} = \left\{\begin{matrix}(C_{10}H_{11})+H\\ ZI+ZO\\ \end{matrix}\right.$$

Consequently, in distilling after the compulsive action of heat and great pressure, the hydride comes over, and there remains in the digester an oxyiodide of zinc.

Hg O

In preparing the hydride of amyle the first step necessary is the purification of the crude fusel oil, which is a mixture of propylic ($C_6H_8O_2$), butylic ($C_8H_{10}O_2$), and amylic alcohols ($C_{10}H_{12}O_2$), and of other alcohols much higher in the series; so that the boiling point, as we found, rises much higher than even 400° F. before the distillation comes to a close. As the boiling point rises from that of propylic alcohol (203° F.) to that of amylic alcohol (269° F.), it can hardly be doubted that the hydrides of the corresponding radicals would vary in their boiling points in at least an equal degree; and as the hydride of amyle has a boiling point of 86° F., there can be little question that the boiling points of the others lower in the series would be so low, that at ordinary temperatures they would exist only as vapours. Dr. Frankland accordingly found that the hydride of ethyle (C_4H_5+H) still remained gaseous, even when submitted to twenty atmospheres of pressure.

A question here suggests itself to the mind: may not these hydrides, existing only in vapour at ordinary temperatures, be anæsthetics themselves, and if so, may their use as such be not an altogether impractical idea?*

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* For instance, may not their saturated solution in alcohol, in which they are readily soluble, give a ready method of obtaining their use as anæsthetics?

From what is known of the volatile liquids got from wood and coal tars and bituminous minerals, these naturally suggest themselves as cheap and ready sources of the hydride of amyle, but from these it does not appear to us that it could be obtained in a sufficient state of purity as an anæsthetic, even though it may be found to form one of their ingredients.

Moreover, the difficulty of separating it from other ingredients, either by fractional distillation or otherwise, would be so great that success would be obtained at too costly a rate; and, after all, we fear the hydride of amyle would hardly fail to repel by the taint attaching to it from such sources.

With a view of getting quit of the expense of the iodine, which, however, can be recovered, we thought of trying the chloride in place of the iodide of amyle, but completely failed in getting the hydride from it, although the digester was subjected to the same heat as the iodide, and for double the time. On removing the preserve from the plug, after proper cooling, an escape of gas took place with a loud report, showing the presence of an uncondensable gas, most probably hydrogen; and on subjecting the contents to distillation, nothing came over till the heat reached the boiling point of the chloride, when nearly the whole of it distilled: besides, the zinc, instead of being matted together, as in the case of the iodide, by the formation of oxyiodide of zinc, was found in the tube quite loose.

In making the iodide of amyle, when the fusel oil has been nearly saturated with iodine, a solid crystalline matter separates, which becomes more abundant on the cooling of the liquid. So far as we have examined the compound, it seems to be a subiodide of phosphorus. It fumes strongly on exposure to the air, and on throwing it, after being firmly pressed in blotting paper into a glass tube containing water, a hissing like red-hot iron in water is produced, and on applying a light to the escaping gas, it takes fire and burns with a brilliant phosphorus flame, and gives abundant white fumes of phosphoric acid, and leaves a red crust of suboxide of phosphorus (?) on the mouth of the tube. The gas appears to be phosphuretted hydrogen. The water on examination was found to contain hydriodic and phosphoric acids. Heated in a test tube it melts at a low heat and boils, giving a sublimate, which condenses in crystals nearly colourless on the sides of the tube. On applying a light to it in the open air it takes fire, burning with a weak flame and the production of a violet coloured smoke. Further investigation into its nature has meanwhile been prevented by falling short of material.

REPORT OF THE
RESULTS OF PHYSICAL AND CHEMICAL INVESTIGATION,
AND OF THE
APPLICATIONS OF PHYSICS AND CHEMISTRY IN THE ARTS.

BY B. H. PAUL, Ph.D.

(*Continued from p.* 570.)

Extraction of Potash from Felspar and similar Minerals.—Prof. Fuchs observed some years since that when an intimate mixture of felspar and lime is ignited, the potash may be dissolved out of the mass by water, but it is necessary in this case to continue the washing for some time. Dr. Meyer,* of Berlin, has recently adopted the same means of rendering the potash soluble, and finds that its extraction is facilitated by digesting the ignited mass with water under a pressure of seven or eight atmospheres. After a short time the liquid becomes so alkaline that it does not contain any lime in solution. By this means he has extracted from felspar containing 13.56 per cent. potash and 0.36 soda, from 9 to 11 per cent. of alkali. He recommends using lime in the proportion of from 14 to 19 equivalents for one of felspar—or for 100 parts of felspar, 139 or 188 parts by weight of lime. Assuming that the alumina acts as an acid, there would be in such a mixture 3 or 4 equivalents of base to one of acid.

The lime may be used in the state either of hydrate or carbonate; it must be intimately mixed with the felspar, the mass rolled into balls three or four inches in diameter, gradually dried, and then kept at a bright red heat for several hours.

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* *Polytech. Journ.*, cxliii., 276.

When the burning has been properly conducted, the mass does not contain either carbonate of lime or caustic lime, and does not become hot with water. After burning, the mass is powdered and treated with water for two or four hours. A second treatment with water is not worth while. The felspar should be ignited and thrown into cold water in order to facilitate the powdering.

The insoluble residue is applicable for the preparation of a very superior kind of Portland cement, for when ignited again it hardens under water very rapidly.

Other minerals besides felspar may be used for this purpose; for instance, many kinds of granite containing 7 per cent. of potash.

Preparation of Iodide of Potassium.—The usual method of preparing iodide of potassium by precipitating periodide of iron with caustic or carbonated alkali, is open to several objections. Prof. Liebig* suggests, as an improvement on the method of preparing iodide of potassium, to dissolve one-third of the iodine in caustic alkali, and to precipitate the iodide of iron with this solution, so as not to introduce an excess of alkali. The pasty precipitate does not appear very uniform at first, but when the mixture is left at rest for some hours and shaken at intervals, a perfect combination of protoxide and peroxide takes place, and the whole of the iodide of potassium may be washed out readily.

Ferruginous Cement.—M. Chenot† prepares cement by mixing together clay or gypsum with spongy iron, obtained by reducing iron ore with hydrogen. Under the oxidizing influence of the atmosphere, the iron is converted into oxide, which is considerably more bulky than the metal, and consequently this change causes a considerable hardening of the cement. Addition of water, urine, ammonia, or vinegar accelerates the hardening very much.

Application of Town Refuse and Sewage for Agricultural Purposes.—Mr. Campbell brought this subject before the Fellows of the Chemical Society at a recent meeting. As the general question of sewage disposition is now being considered by a committee appointed for the purpose, Mr. Campbell confined himself to the consideration of those chemical facts which had a direct bearing upon the applicability of excremental material and town sewage as manure.

From a comparison of the results obtained by various observers, Mr. Lawes and Dr. Gilbert have computed that the quantity of fecal and urinary excretions voided daily by a single individual contains on the average 2 ounces of dry substance. Of this, one-fifth may be taken as equivalent to ammonia, another fifth as mineral substance, and the remaining three-fifths as organic substance. The agricultural value of excremental material is therefore to be sought in the two-fifths of dry solid, representing ammonia and mineral substances.

According to the "Analyses of the Ash of Feces and of Urine," published by Mr. Way in the Journal of the Royal Agricultural Society, the average quantity of phosphoric acid excreted daily by each individual is 30·4 grains.

The quantity of potash calculated from the same analyses amounts to 21·7 grains daily for each individual.

For a population of 10,000, therefore, the quantity of dry solid in the excrement yearly will amount to 205 tons, which would have a money value of £3075 sterling. This estimate is made upon the assumption that the ammonia in excremental material is worth £70 per ton; the phosphoric acid £56 per ton; and the potash £70 per ton.

The amount of these three substances was particularly referred to, because there is no question as to their agricultural value, provided they are to be procured in a condition available for the food of plants.

In the case of excremental material this circumstance seriously affects its value as manure. Thus, for instance, the quantity of water in fresh feces amounts, according to the analyses of Berzelius and others, to upwards of 70 per cent., while that in urine amounts to 93 per cent.

The value of solid and liquid excrement as manure has not only been pointed out by various chemists, but has long been recognized by agriculturists, for they had long been in use, both in this country and on the Continent, though without any attempt to manufacture them into a more portable and less objectionable form than they are delivered by nature, until early in this century, when, in 1802, a M. Estienne proposed to gather the excrements into tanks, to allow the liquid part to run off, and to dry the residue in the sun, either alone or mixed with lime.

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* *Annalen der Chemie und Pharmacie*, c., 339.

† *Journ. de Pharm.*, Jan., 1857.

When this dry mass was stowed into sheds in heaps its temperature rose to 212 deg. Fah.; afterwards it was crushed into a powder, which is stated to have been devoid of all smell, and not very bulky. A few years afterwards Sir Humphrey Davy, in a lecture delivered to the Board of Agriculture, mentioned especially mixing quicklime with nightsoil, to deprive it of its disagreeable smell, and observed at the same time that the Chinese, whom he considered to possess more practical knowledge of the use and application of manures than any other nation, are in the habit of mixing their nightsoil with one-third of its weight of fat marl, make it into cakes, and dry it by exposure to the sun. "These cakes," Sir Humphrey adds, "we are informed by the French missionaries, have no disagreeable smell, and form a common article of commerce of the empire."

After these suggestions on disinfecting nightsoil, and depriving it of odour, no further progress appears to have been made until as late as 1835, when M. Pottevin noticed the value of carbon, as an adjunct to marl, for disinfecting substances, and obtained a patent for the preparation of a powder containing charcoal for this purpose.

After M. Estienne and M. Pottevin follow a number of other inventors, with methods which exhibit a more or less striking ignorance or disregard of the true principles of manuring, and of the real value of manure. Many of these methods, although patented, are identical; others are evidently useless for the purpose of producing manure of any agricultural value. Those which are most feasible consist in mixing with the excrement some absorbent substance, such as lime or charcoal; but as the value of manure depends upon the relation between the mass and the amount of particular constituents, the advantage of this plan cannot be great, because these substances have not such agricultural value as will admit of their transport to any great distance, and because the solid excrement to which they might be applied most efficaciously, as far as the production of a dry portable mass is concerned, is very much less valuable as manure than urine, and this would require such a large amount of lime or charcoal for that purpose as to be seriously reduced in value.

This constitutes the chief obstacle to the profitable use of excrement for agricultural purposes; for, although the gross amount of valuable substances contained in the excrement of even a small population may be very considerable, the separation of the large amount of water would be too costly to admit of being practically carried out, and the admixture of absorbent substances would decrease the value per ton, while it augmented the cost of transport.

Mr. Bridges Adams has, in a recent number of the *Engineer*, discussed the possibility of dealing with the excrement of the population of London without allowing it to pass into the sewers. He considers that if, by a mechanical arrangement of water-closets, the fæces and urine are collected apart, the latter may be barrelled up and very profitably transported by rail to agricultural districts.

He estimates the annual quantity of urine at 24,428 tons, but since urine contains 97 per cent. of water, and only 1 per cent. phosphoric acid and nitrogenous substance, equivalent to only 0.7 per cent. ammonia, it would be necessary to use about 30 tons, for the purpose of applying half a cwt. of ammonia to an acre. The cost of carriage for this quantity 20 miles beyond London would be about £2, whereas half a cwt. of ammonia can be bought for much less than £2, either as sulphate of ammonia or guano, and the cost of application to the land would be very considerably less than that of urine.

To dispose of the fæces, Mr. Adams suggests removal by carts from each house, and considers that it would be no difficult matter to distil them in gas retorts, to use the gas produced for lighting, and the residual charcoal as fuel. But Mr. Adams does not offer any suggestion as to the means by which, for this purpose, the fæces are to be dried and deprived of their water, amounting to more than 7-10ths by weight.

To compensate for the purification by water, Mr. Adams says: "In constructing closets without water the arrangement must be such as to separate the fluid from the solid by a diaphragm. To prevent a gaseous odour from arising two processes may be used—First, a chemical absorbent; and, secondly, an inch or two of fluid oil floating on the surface, through which both fluid and solid will pass, and be thus hermetically sealed. Probably a gallon of oil at about 3s. would be required once in three months. In a family of twelve persons the total solid produce in three months would be about three feet. If made to fall into a cast-iron retort built into a furnace it would take scarcely any trouble, and only a few hours of a night, once in three months, to burn a few coals and utterly destroy it, burning the gas evolved at the same time."

It appears, therefore, very evident, from these facts, that Mr. Adams must have disregarded some important data in devising this very ingenious scheme.

However, under the system of sewers, which is now general in London, and which prevails more or less in most towns throughout this kingdom, the utilisation of excremental material in this manner is impossible, on account of the large proportion of water with which it is blended in its passage into the sewers; and the profitable use of nightsoil as a manure, either in the natural state, or prepared by any of the methods already described, will be restricted to the immediate neighbourhood of those places where water-closets are not in general use.

In town sewage, the chief element of manure value is the excremental material, and this, in the instance of London, with a population of 2,600,000, amounts annually to 53,393 tons of dry solid, which, as already shown, contains ingredients which give it a value of £15 per ton at least.

The quantity of ammonia NH_4O which this contains or is capable of producing is	11,440 tons
The phosphoric acid PO_5	1,839 "
And the potash KO	1,331 "

These three items make up a money value of about £836,834. In this estimate no account is taken of the suspended particles of animal substance, such as skin, hair, &c., which find their way into the sewers, from various sources, and which Mr. Campbell found to represent a quantity of ammonia nearly equal to 0·4 per cent. of the dry solid residue obtained by evaporating sewage water. In addition to these substances, the quantity of soda (NaO), calculated from the same data, and originating from excreta, amounts annually to upwards of 2000 tons.

It may be that materials of agricultural value flow into the sewers of London even at the present time from other sources; but as this would not be the case when the sanitary arrangements of the town shall have acquired a normal condition, no notice of such materials can be required for the present purpose.

The circumstances which operate in the opposite direction—viz., in reducing the value of the sewage for agricultural purposes, consist chiefly in the admixture of the water consumed for household purposes, for some manufacturing operations, and also the rain falling upon the area drained by the sewers.

The water supply being very unequal in different towns, the sewage will be proportionately different in concentration, and probably also in condition, since the sewage of towns where there is a copious supply of water issues from the mouths of the sewers for the most part fresh, while that of towns where the water supply is small, or the construction of the sewers defective, is always putrid, and contains the greater part of the nitrogen in the state of ammoniacal salts.

In all towns in Great Britain which are supplied by water companies, the consumption is, in round numbers, from 12 to 20 gallons daily for each individual, inclusive of wholesale consumers. The difference arises chiefly from the fact that in many places there are neither water-closets nor sewers.

	Gallons per head daily.
Ashton-under-Lyne	14
Duckinfield	12 to 14
Bury	
Brighton	20
Preston	20
Edinburgh	25
Liverpool	22
Manchester	25
Glasgow	50

Where the consumption per head is least, closets are used only by a few, and where the consumption is high, closets are almost universal.

In some towns in America the supply reaches as much as 100 gallons per head daily.

In 1854 the water supply of London averaged 20 gallons per head daily; at the present time it amounts to 32 gallons per head, the total amount supplied by the metropolitan water companies being 81,000,000 gallons daily; in addition to this, about 11,000,000 gallons are obtained daily from the deep wells for brewing and other manufacturing purposes, a considerable amount of which ultimately passes into the sewers. Then there is the rainfall, which, on the average, amounts to about 25 gallons per head daily, so that the total amount of water disposed of in London amounts to 167,000,000 gallons daily, or 60,955,000,000 yearly.

Consequently, the 53,393 tons of excremental substance produced in the year will be distributed throughout a quantity of water which, in round numbers, may be fixed at 250,000,000 tons; and one ton of excremental substance, containing the constituents that have a money value of £15, will be distributed through a mass of liquid weighing 4682 tons. Herein is the great difficulty of dealing with the sewage for agricultural purposes.

The water itself will contain some substances of value as manure: Nitric acid, organic substance, alkalies, amounting on the average to 0.5 grain potash in the gallon, and to 1.0 grain soda NaO in the gallon.

(*To be continued.*)

ALUM IN BREAD.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—I have read with some interest the two articles in the last number of the *Pharmaceutical Journal*, on the different modes of analysis for the detection of alum in bread; and, while agreeing with the authors on the main facts, I feel that the matter is left in an unsettled and unsatisfactory state. I therefore purpose, by your favouring me with the insertion of this in your next Journal, to advance the question a step further.

That alumina in small quantity cannot be precipitated in an organic fluid, such as an infusion of bread, I believe will be admitted. Therefore the only mode of detecting it is by combustion; but as it has been found that alumina does enter into the composition of some kinds of wheat, the presence of this substance is not conclusive of the presence of alum. It is consequently necessary to prove the presence of the other constituents of this salt in more than normal amount, and a certain and easy process I believe is a desideratum. The following, I think, will be found to fulfil this:—

Let the bread be soaked in distilled water, rather strongly acidulated with nitric acid, for twenty-four or thirty-six hours. Pour off the liquor, and press the residue, if thought necessary, and filter. Divide the filtrate into two portions, and evaporate one part to dryness, and incinerate the extract. The ash is to be examined for alumina in the usual way.

To the second portion of the filtrate, add ammonia in slight excess; boil and filter; acidulate this again with nitric or hydrochloric acid, and test for sulphuric acid. In some cases it will be advisable to concentrate this fluid before precipitation. The results by this method are clear and unambiguous. The same process is equally applicable to flour.

I cannot conclude this letter without expressing my opinion, in opposition to the editorial remarks, relative to the right or wrong of using alum in bread; and right or wrong it must be.

In the first place, it opens the door to fraud and unequal competition. That which is indifferent in quality, is made to resemble the best, and probably sold for it.

Secondly. Can it be said with truth that invalids and young children sustain no injury by the use of such bread? The healthy and strong may feel no immediate injury, but is it certain the seeds of disease are not sown?

Thirdly. If permitted by law, what is to be the amount, and who is to know when that is exceeded?

In conclusion, I think it almost as necessary that our bread should be as free from admixture as our medicines.

I am, Sir, your obedient servant,

Bradford, May 14, 1857. F. M. RIMMINGTON.

[We disclaim any intention of sanctioning directly or indirectly the use of alum or any other substance prohibited by law as an ingredient in bread. If any observations in this Journal should have been supposed to admit of such construction, we regret the existence of any ambiguity, and take this opportunity of placing the question in its proper light. The effect of alum when used in the manufacture of bread—the *modus operandi* by which it improves the appearance of inferior flour—the chemical state of the alum in bread in which it has been so incorporated—and the comparative sanitary qualities of bread with and without alum—are questions of fact which constitute a very legitimate and useful field for scientific inquiry. Supposing it to be proved that the injurious effects of alum have been somewhat exaggerated, or that alum is decomposed and does not exist as alum in bread, or that the deleterious properties of the alum (if any) might be counteracted or diminished by any modification of the process—it would not follow, as a necessary deduction, that the law prohibiting the use of alum should be disregarded. Although the above and other similar propositions have been entertained, and to some extent supported on scientific authority, the *primâ facie* prejudice is against that view of the question. There is a natural objection to any chemical process which has the effect of giving a bad sovereign the appearance of a good one, and before such process could be generally received as justifiable it would be necessary to prove that the result is intrinsically for all practical purposes conducive to the public interest or benefit. The *onus probandi* rests upon those who affirm the proposition, and the pages of a scientific Journal are open to a free discussion of both sides of the question. We have already stated, and repeated it in our last number, that the subject requires further investigation, pending which we give no sanction to a violation of the law, and still retain a very strong bias in favour of bread without alum—whenever it can be obtained.—ED. PHARM. JOURN.]

PARCHMENT-PAPER.

AT a meeting of the Royal Institution, held on Friday, the 3rd of April, the subject of the discourse delivered by the Rev. J. Barlow, Vice-President and Secretary to the Institution, was "*On some modifications of woody fibre and their applications*," in the course of which an interesting description was given of the substance to which the name *Parchment-paper* has been applied. This substance is the invention of Mr. W. E. Gaine, C.E., by whom the process for its preparation has been patented. Mr. Barlow having described several of the applications of woody fibre, and particularly its application in the manufacture of paper, referred to the chemical and physical changes effected in paper and analogous fabrics by treating them with chemical agents. He contrasted with the pyroxylised textures of Kuhlmann and the gun-paper of Pelouze, the woven fabrics subjected to Mercer's process, and the *Parchment-paper*, the invention of Mr. Gaine. By acting on cloth with chloride of zinc, tin, or calcium, with sulphuric and arsenic acid, and, especially, by the caustic alkalies in the cold (the temperature sometimes being lowered to — 10° Fahr.), Mr. Mercer has obtained many important effects on the fineness and general appearance of cloth, and its susceptibility of dye. This subject was brought before the Royal Institution by Dr. Lyon Playfair, C.B.,* and it has since been closely investigated by Dr. Gladstone.† Mr. Mercer also experimented on the effect of acids on paper. It being known that sulphuric acid, under certain conditions, modified vegetable fibre, Mr. Gaine instituted a course of experiments to ascertain the exact strength of acid which would produce that effect on paper which he sought, as well as the time during which the paper should be subjected to its action.

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* *Proceedings of the Royal Institution*, vol. i., p. 134 (1852).

† *Journal of the Chemical Society*, vol. v., p. 17 (1853).

He succeeded in discovering, that when paper is exposed to a mixture of two parts of concentrated sulphuric acid (*s. g.* 1.854, or thereabouts) with one part of water, for no longer time than is taken up in drawing it through the acid, it is immediately converted into a strong, tough, skin-like material. All traces of the sulphuric acid must be instantly removed by careful washing in water. If the strength of the acid much exceeds or falls short of these limits, the paper is either charred, or else converted into dextrine. The same conversion into dextrine also ensues, if the paper be allowed to remain for many minutes in the sulphuric acid after the change in its texture has been effected.

In a little more then than a second of time, a piece of porous and feeble unsized paper is thus converted into the *Parchment-paper*, a substance so strong, that a ring seven-eighths of an inch in width, and weighing no more than 23 grains, sustained 92 lbs.; a strip of parchment of the same dimensions supporting about 56 lbs. Though, like animal parchment, it absorbs water, water does not percolate through it. Though paper contracts in dimensions by this process of conversion into *Parchment-paper*, it receives no appreciable increase of weight, thus demonstrating that no sulphuric acid is either mechanically retained by it, or chemically combined with it. It has also been ascertained by analysis, that no trace of sulphur exists in the *Parchment-paper*. The fact of this paper retaining its chemical identity, constitutes an important distinction between it and the gun-papers of Pelouze and others. Unlike those substances, it is neither an electric, nor more combustible than unconverted paper of equal size and weight, nor soluble in ether or potash. Unlike common paper, it is not disintegrated by water; unlike common parchment, it is not decomposed by heat and moisture. In this remarkable operation, the action of the sulphuric acid may be classed among the phenomena ascribed to catalysis (or contact action). It is, however, conceivable that this acid does at first combine with the woody fibre, with or without the elimination of oxygen and hydrogen, as water; and that this compound is subsequently decomposed by the action of water in mass, during the washing process, the sulphuric acid being again replaced by an equivalent of water; for, as has been before stated, the weight of the paper remains the same before and after its conversion. Mr. Warren De la Rue and Dr. Müller are engaged in researches on this subject, which will be hereafter published.

Those who are interested in chemical inquiry will recal many instances of physical changes occurring in compound bodies, while these bodies retain the same elements in the same relative weights. The red iodide of mercury is readily converted by heat into its yellow modifications; yet, by the mere act of being rubbed, it is made to resume its former colour. Nothing is added to or taken from this substance in the course of these changes. The inert and permanent crystals of cyanuric acid are resolved by heat into cyanic acid—a volatile liquid, characterized by its pungent and penetrating odour, and so unstable that, soon after its preparation, it changes into a substance (cyamelide) which is solid, amorphous, and destitute of all acid properties. These substances, as well as fulminic acid (which, however, is known in combination only), contain carbon, nitrogen, oxygen, and hydrogen, in the same relative proportion. But the closest analogy to the production of *Parchment-paper*, scientifically considered, is perhaps afforded by what is called "the continuous process" in etherification. It will be remembered that, in this process, sulphuric acid, at a temperature of 284° Fah., converts an unlimited quantity of alcohol into ether and water. In the first stage of this process, as explained by Williamson, it would appear that the sulphuric acid combines with the elements of ether to form sulphovinic acid; and that, in the further progress of the operation, this compound, by coming into contact with a fresh equivalent of alcohol, is, in its turn, decomposed, and resolved into ether and sulphuric acid. The ether distils over together with the water resulting from the decomposition of the alcohol; the sulphuric acid remains in the retort, ready to act on the next portion. Here, as in the case of the *Parchment-paper*, the sulphuric acid does not form a permanent constituent of the resulting substance, though it takes so important a share in its production.

The strength of this new substance before alluded to, and its indestructibility by water, indicate many uses to which it may be applied. It will probably replace to some extent vellum in bookbinding; it will furnish material for legal documents, such as policies of insurance, scrip certificates, &c.; it will take the place of ordinary paper in school-books, and other books exposed to constant wear. Paper, after having been printed either from the surface or in intaglio, is still capable of conversion by Mr. Gaine's method ; no part of the printed matter being obliterated by the process. *Parchment-paper* also promises to be of value for photographic purposes,[*] and also for artistic uses, in consequence of the manner in which it bears both oil and water-colour. It is about to be introduced into commerce by Messrs. Thomas de la Rue and Co.

ON THE SEA SAW-DUST OF THE PACIFIC.

BY JOHN DENIS MACDONALD, ESQ.,

Assistant Surgeon, R.N.

In this communication the author gives a description (illustrated by figures) of the remarkable little algal so frequently met with in the South Pacific, scattered over the surface of the water in broad streaks and patches of a pale yellowish-brown tint, and which is known under the name of "Sea Saw-dust."

After adverting to the occurrence of a similar phenomenon in other parts of the globe, and citing the account given of the *Trichodesmium erythræum* of the Red Sea by MM. Evernor Dupont and Montagne, together with a description extracted from the *Colombo Herald* of May 14, 1844, of what was obviously an example of a vegetable scum of the same kind occurring on the sea off Ceylon, the author remarks, that in the instances met with by himself he did not recognise the fœtid odour so generally and pointedly spoken of in the accounts of others. He then states results of his own observation as follows :—

"It was rather difficult at first to determine whether our species is to be referred to the Oscillatoridæ or the Confervidæ. In the latter, a linear series of tubular cells compose the filaments, which are thus said to be jointed, but in the former, although the filaments are tubular, simple and continuous without actual joints, a pseudo-jointed appearance is presented by the apposition of the little masses of contained colouring matter. Notwithstanding, having submitted the 'sea saw-dust' of the Pacific to microscopic examination on several occasions, I was much inclined to believe that the filaments were actually jointed ; and this view is supported by the circumstance that an empty tubule, or one in which the parietes may be traced continuously without being interrupted by joints or internal septa, has never fallen under our notice ; besides which the filaments are exceedingly brittle, usually suffering cleavage in the transverse direction. It, however, undoubtedly belongs to the Oscillatoridæ.

"When the filaments are first removed from the water, they may be observed adhering side by side in little bundles or fasciculi ; and besides the colouring matter, the little cells, or at least the intervals between the septa, contains globules of air, which sufficiently account for their buoyancy ; and, moreover, in this respect, although their abiding place is the open ocean, their habit can scarcely be regarded as very different from that of those species which flourish in damp localities exposed to the atmosphere.

"The filaments are all very short compared with their diameter, with rounded extremities ; and when immersed some little time in fluid so that the contained air-bubbles make their escape or are taken up, the pale colouring matter appears to fill the cells completely, and a central portion, a little darker than the rest, may be distinctly perceived in each compartment intersected by a very delicate transverse partition.

"We have found this species off the coast of Australia and in Moreton Bay, amongst the Polynesian Islands, and on two separate occasions off the Loyalty Group, in nearly the same geographical position."—*Proceedings of the Royal Society.*

ON THE EXISTENCE OF SILVER IN SEA-WATER.

BY FREDERICK FIELD, F.C.S.

In a paper first published by MM. Malaguti, Durocher, and Sarzeaud, in the *Annales de Chimie et de Physique*, xxviii., p. 129, and translated in the *Quarterly Journal of the Chemical Society*, vol. iii., p. 69, there is an account of the detection and estimation of silver in sea-water. The authors suspected the existence of the metal from the extensive diffusion of silver in the mineral kingdom, the conversion of its sulphide into chloride by the prolonged action of soluble bodies containing chlorine, and the solubility of chloride of silver in chloride of sodium. The method pursued was by passing sulphuretted hydrogen through large quantities of water, and also by fusing the salts obtained by evaporation with litharge and subsequent cupellation.

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[*] Photographs on this paper were exhibited.

As a solution of chloride of silver in chloride of sodium is instantly decomposed by metallic copper, chloride of copper being formed and silver precipitated, it appeared to me highly probable that the copper and the yellow metal used in sheathing the hulls of vessels must, after long exposure to sea-water, contain more silver than they did before having been exposed to its action, by decomposing chloride of silver in their passage through the sea, and depositing the metal on their surfaces. A large vessel, the Ana Guimaraens, now under the Chilian flag, was hauled down in the Bay of Herradura, near Coquimbo, for the purpose of being repaired, and the captain obligingly furnished me with a few ounces of the yellow metal from the bottom of the vessel. The investigation was interesting, as the metal had been on for more than seven years (an unusually long period), and the ship had been trading up and down the Pacific Ocean all that time. The metal, upon examination, was found to be exceedingly brittle, and could be broken between the fingers with great ease. 5000 grs. were dissolved in pure nitric acid, and the solution diluted; a few drops of hydrochloric acid were added, and the precipitate allowed to subside for three days. A large quantity of white insoluble matter had collected by that time at the bottom of the beaker. This was filtered off, dried, and fused with 100 grs. pure litharge and suitable proportions of bitartrate of potash and carbonate of soda, the ashes of the filter also being added. The resulting button of lead was subsequently cupelled, and yielded 2.01 grs. silver, or 1 lb. 1 oz. 2 dwt. 15 grs. troy per ton. This very large quantity could hardly be supposed to have existed in the original metal, as the value of the silver would be well worth the extraction. It is to be regretted that the captain had none of the original on board. A piece of yellow metal with which he was repairing the vessel yielded only 18 dwts. to the ton. I was enabled by the courtesy of the captain of the Nina, a brig which had just arrived in the Pacific from England, to obtain more satisfactory information. He gave me a piece of Muntz's yellow metal from his cabin, from the same lot with which the brig was sheathed, but which had never been in contact with salt water; and also a small portion from the hull of the ship after it had been on nearly three years. The experiments were performed as before, and the results were very striking:

grs.		grs.		oz.	dwts.	grs.	
1700	from cabin gave	.051	=.003 per cent.=	0	19	14	per ton
1700	from hull "	.400	=.023 " =	7	13	1	"

That which had been exposed to the sea having nearly eight times as much silver as the original sample.

Many other specimens were examined of metals from the bottoms of ships, and of pieces which are always kept on board in case of need, and it was invariably found that the former contained more silver than the latter. For instance, a piece from the hull of the Bergmann gave 5 ozs. 16 dwts. 18 grs. per ton, while that from the cabin yielded 4 ozs. 6 dwts. 12 grs. 200 grs. from a piece from the hull of the Parga gave .072 grs., and a piece of fresh metal .050; while from the Grasmere, only coppered a few months, 610 grs. from the hull gave .075, and from the cabin .072—a very slight difference indeed.

It will be observed that the amount of silver in the above specimens of fresh metal is very high, and it is probable that most of these are merely the re-rolling of masses of metal melted down from old sheathing, and have derived the greater part of their silver from the sea on former occasions. It is well known that the copper used in the manufacture of yellow metal is very pure, containing 2 or 3 dwts. of silver per ton, frequently not so much, and silver is very seldom associated with the other constituent, zinc. In order to arrive at more certain results, however, I have granulated some very pure copper, reserving some in a glass-stoppered bottle, and suspended the reminder (about 10 ounces) in a wooden box, perforated on all sides, a few feet under the surface of the Pacific Ocean. When occasion offers, the box is towed by a line at the stern of a vessel which is trading up and down the coast of Chili. It is almost too soon to expect any decisive results at present, but in a few months I hope to be enabled to send both the original copper and that which has been exposed to the action of the sea.—*Proceedings of the Royal Society.*

SALE OF POISONS, &c., BILL.

ARRANGEMENT OF CLAUSES.

COMMENCEMENT of Act, sect. 1. 14 and 15 Vict., c. 13, repealed, 2. Definition of poison, 3. Other substances and preparations may be added by order in Council to those in the schedules, 4. Poison to be sold only to a person of full age in presence of a witness of full age, and upon the production of a certificate, 5. Entries to be made regarding the sale of poisons, 6. All poisons, &c., sold, to have proper coverings, to be distinctly labelled, with address of vendor, and the word "Poison" to be moulded on the bottle, 7. Colourless solid poisons sold must be mixed with soot or indigo, 8. Colourless liquid poisons must be coloured by archil, 9. Gift of poisons to be subject to the provisions applicable to sales, 10. Prescriptions of medical men and sales by wholesale or for lawful use in trade or occupation exempted, 11. Poisons to be distinctly labelled and kept apart in the shop or dispensary. Poisonous medicines for external use to be put in coloured bottles of a peculiar shape, 12. Penalty for offending against the Act, 13. Schedules.

A BILL INTITULED AN ACT TO RESTRICT AND REGULATE THE SALE OF POISONS.

Whereas the existing restrictions on the sale of arsenic have been found to be insufficient, and the unrestricted sale of other poisons facilitates the commission of crime, and occasions frequent fatal accidents: Be it enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows :—

I. Save where herein otherwise provided, this Act shall commence and take effect from and after the   day of   One thousand eight hundred and fifty-seven.

II. The Act of the session holden in the fourteenth and fifteenth years of Her Majesty, chapter thirteen, "to regulate the sale of arsenic," shall be repealed.

III. In the construction of this Act the word "Poison" shall mean any drug or substance mentioned or referred to in the schedule (A) to this Act, and also any compound, preparation, or mixture containing any such drug or substance, except only such compounds, preparations, or mixtures as are specified in the schedule (B) to this Act.

IV. Provided, that in case it appear to Her Majesty in Council that the unrestricted sale of any drug or substance not mentioned in the schedule (A) to this Act should be subject to the restrictions of this Act, it shall be lawful for Her Majesty, with the advice of her Privy Council, to order that such drug or substance shall be subject to the provisions of this Act concerning poison ; and in case it appear to Her Majesty in Council that the sale of any compound, preparation, or mixture containing any drug or substance, being poison within the meaning of this Act, may be safely exempted from the restrictions of this Act, it shall be lawful for Her Majesty, with such advice as aforesaid, to order that such compound, preparation, or mixture shall be exempted from the provisions of this Act applicable to poison ; and every order in Council made under this provision shall be published in the *London Gazette ;* and upon the expiration of one month after the publication of such order, unless a later time be mentioned in such order, and in that case after the time so mentioned, the drug or substance thereby declared subject to the provisions of this Act concerning poison shall for all the purposes of this Act be deemed poison, as if it had been mentioned or referred to in the schedule (A) to this Act ; and any compound, preparation, or mixture declared by such order to be excepted from the provisions of this Act concerning poison, shall be so excepted accordingly, as if it had been specified in the schedule (B) to this Act.

V. No person shall sell any poison, on any pretence whatsoever, unless the sale be made to a person of full age, and in the presence of a witness of full age, who is known to the person selling the poison, and to whom the purchaser is known, and unless there be produced and delivered to the seller, before such sale, a written certificate, signed by the clergyman of the parish or district, or a legally qualified medical practitioner, or a justice of the peace acting for the county or place, and dated, stating that the person giving such certificate knows the applicant, and believes that the poison may be safely supplied to him, and is to be used for the purpose of his trade, or for some other lawful purpose to be mentioned in such certificate, and all such certificates shall be carefully preserved by the seller in the order in which they are received.

VI. Every person who sells any poison shall forthwith, and before the delivery of the same, enter or cause to be entered, in a fair and regular manner, in a book or books to be kept for such purpose, in the form set forth in the schedule (C) to this Act, or to the like effect, a statement of such sale, and the following particulars :—

1. The date of the sale and delivery of such poison:
2. The name and surname of the purchaser:
3. His place of abode, condition, or occupation:
4. The name and quantity of the poison sold:
5. The purpose for which such poison is stated to be required:
6. The name and condition of the person giving the certificate for such purchase with the date of such certificate.

Into all of which circumstances the person selling such poison is hereby required and authorized to inquire of the purchaser before the delivery of the poison; and such entries shall in every case be signed by the person making the same, and shall also be signed by the purchaser and by the witness, who shall add his place of abode.

VII. No poison sold shall be wrapped in paper only without a covering of tinfoil, and all poison sold shall have the bottle, or other vessel, box, wrapper, or cover (as the case may be), containing such poison, distinctly labelled in conspicuous capital letters, white on a black ground, with the word "POISON," and with the name and surname and address of the person selling such poison, and every bottle containing any such poison shall have the word "POISON" cast or moulded in raised letters on four sides of the bottle.

VIII. No person shall sell any colourless poison whatsoever in a solid state, unless the same be before the sale thereof mixed with soot or indigo in the proportion of one part by weight of soot at the least to fifteen parts by weight of the poison, or of one part by weight of powdered indigo at the least to thirty-one parts by weight of the poison, save where such poison is stated in the certificate to be required for some lawful purpose for which such admixture would, according to the representation of the person giving the certificate, render it unfit, and in that case such poison may be sold without such admixture in quantities of not less than half a pound.

IX. No person shall sell any colourless poison whatsoever in a liquid state, unless the same be before the sale thereof mixed with such a quantity of a strong solution of archil, not being less than ten minims by measure to one fluid ounce of the poison, as will give the fluid a decided colour, save where the poison is stated in the certificate to be required for some purpose for which such admixture would, according to the representation of the person giving the certificate, render it unfit, in which case such poison may be sold without such admixture.

X. If any poison be given or delivered (whether gratuitously or in exchange for any other article or thing) by any person whatsoever to any other person, such gift or delivery shall for the purposes of this Act be deemed a sale, and all the provisions and penalties of this Act applicable to a sale of poison shall apply to such gift and delivery, and for the purposes of this Act the person giving or delivering the poison shall be deemed the seller, and the person to whom the same is given or delivered shall be deemed the purchaser.

XI. The provisions hereinbefore contained shall not extend to the sale of any medicine required to be made up or compounded according to the prescription of a legally qualified medical practitioner, or made up or compounded by a legally qualified medical practitioner, or to the sale of poisons by wholesale to retail dealers, or legally qualified medical practitioners, upon orders in writing, in the ordinary course of wholesale dealing, or by wholesale or retail to Manufacturing or Analytical Chemists, or by or to persons carrying on the trade or business of painters, manufacturers of, and dealers in colours, artists' colourmen, glass or shot manufacturers, veterinary surgeons, dyers, paperstainers, electro-platers, photographers, braziers, whitesmiths, bird-stuffers, or firework makers, provided the poison is stated to be required and may be reasonably believed to be required for the ordinary purposes of trade or lawful occupation, and not for any other purpose whatsoever.

XII. And whereas it is expedient that as well members of the medical profession as others should be subject to regulations in respect of the keeping of poisons and the delivery of poisonous preparations intended for external use :

Every person who keeps for sale by retail any poison, and every Apothecary, Surgeon Apothecary, or other member of the medical profession, and every officer of any hospital infirmary, or dispensary, who has under his custody any poisons, shall keep all such poisons separated from all other drugs and medicines, and distinctly labelled with their proper English names, in a closet set apart for this purpose, under lock and key:

All liquid medicines intended for external use, and consisting of or containing any poison, shall be sold and delivered in bottles of blue coloured glass, and of a quadrangular shape, and labelled in conspicuous capital letters, white on a black ground, "POISON," or "FOR EXTERNAL USE;" the word "POISON," or the words "FOR EXTERNAL USE," being also cast or moulded in raised letters in the glass on the four sides of the bottle.

XIII. If any person sell any poison, save as authorized by this Act;

Or deliver the same, without having made and signed the entries hereby required on such sale, or without having obtained such signatures to such entries as are required by this Act, or without complying with all the provisions of this Act in relation to the sale of such poison;

Or if any person purchasing any poison give false information to the person selling the same in relation to the particulars which such last-mentioned person is hereby authorized to inquire into of such purchaser, or procure, by a false certificate or other false pretence, such poison, or procure by false pretences a certificate for the purchase of poison from any clergyman, medical practitioner, or justice of the peace;

Or if any person sign his name as aforesaid as a witness to a sale of poison to a person unknown to the person so signing as a witness;

Or if any person hereby required to keep any poison under lock and key as hereinbefore mentioned fail so to keep such poison at all times, except when actually selling, dispensing, or lawfully using such poison;

Or if any person sell or deliver any liquid intended for external use, and containing any poison, otherwise than in such a bottle of coloured glass as aforesaid, and labelled as aforesaid;

Every person so offending shall for every such offence, upon a summary conviction of the same before two justices of the peace in England or Ireland, or before two justices of the peace or the sheriff in Scotland, be liable to a penalty not exceeding twenty pounds for the first offence, and to a penalty not exceeding fifty pounds for the second, or any subsequent offence;

And the person so convicted of such second or subsequent offence shall be for ever thereafter disabled from selling any poison, or carrying on the business of a Chemist and Druggist; and if such person so disabled sell to any person, or in any manner whatsoever, any poison, or any compound, preparation, or mixture containing any poison, or carry on the business of a Chemist and Druggist, or sell any drug or medicinal substance whatsoever, every person so offending shall for every such offence, upon a summary conviction of the same before two justices of the peace in England or Ireland, or before two justices of the peace or the sheriff in Scotland, be liable to a penalty not exceeding fifty pounds.

Schedules to which the Act refers.

SCHEDULE (A).

Arsenic and its compounds. Corrosive sublimate and its compounds. The poisonous vegetable alkaloids. Prussic acid. Cyanides of potassium, mercury, and silver. Chlorides of zinc and antimony. Essential oil of bitter almonds, and any mixture containing it. Cantharides and its preparations. Belladonna and its preparations. Hemlock and its preparations. Aconite and its preparations. Opium in tincture, extract, and powder. Foxglove and its preparations. Stramonium and its preparations. Chloroform and its compounds. Oxalic acid and binoxalate of potash. Nux vomica seeds and bark. Tartarized antimony and its solution. Cocculus indicus. Ergot of rye. Savin. Lobelia. And all liquids or solids containing or consisting wholly or in part of the above-mentioned poisons, poisonous drugs and herbs.

SCHEDULE (B).

The under-mentioned compounds, prepared according to the directions of the Pharmacopœias of London, Edinburgh, and Dublin, or any of them:—Sulphuric, nitric, and muriatic acids, diluted according to the formulæ of the British Pharmacopœias, or with a larger proportion of water. Cerate, ointment, and plaster of cantharides, blistering cloth. Plaster and ointment of belladonna. Compound pill of hemlock of the London Pharmacopœia. Compound pill of soap of the London and Dublin Pharmacopœias. Pill of calomel and opium (Edinburgh Pharmacopœias). Pill of lead and opium (Edinburgh Pharmacopœia). Compound powder of chalk with opium (London Pharmacopœia). Electuary of opium (Edinburgh Pharmacopœia). Confection of opium (London Pharmacopœia). Plaster of opium (London, Edinburgh, and Dublin Pharmacopœias). Liniment of opium (London and Edinburgh Pharmacopœias). Ammoniated tincture of opium (Edinburgh Pharmacopœia). Ointment of opium (London Pharmacopœia).

Compound ointment of the gall nut (London and Edinburgh Pharmacopœias). Compound pill of storax (London and Edinburgh Pharmacopœias). Compound powder of ipecacuanha (London, Edinburgh, and Dublin Pharmacopœias). Pill of ipecacuanha and opium (Edinburgh Pharmacopœia). Compound powder of kino (London Pharmacopœia). Electuary of catechu (Edinburgh Pharmacopœia). Pill of foxglove and squills (Edinburgh Pharmacopœia). Ointment of tartarized antimony (London, Edinburgh, and Dublin Pharmacopœias). Savin ointment (London Edinburgh, and Dublin Pharmacopœias).

SCHEDULE (C).

Date of Sale and Delivery.	Name and Surname of Purchaser.	Purchaser's Place of Abode and Occupation.	Name and Quantity of Poison sold.	Purpose for which required.	Name of Person giving Certificate.
Saturday, Sept. 26, 1856. 10 30 A.M.	*Henry Holmes*	27, *Snow's Fields, Bermondsey, Shoemaker.*	*Arsenic ¼ lb. Coloured Blue with Indigo.*	*For destroying Rats and Mice.*	*James Paget, Incumbent of St. Olave's, Bermondsey.*

(*Signature of Purchaser.*)
HENRY HOLMES.

(*Signature of Witness.*)
JOHN SIMS,
26, Tooley Street,
Southwark.

(*Signature of Vendor.*)
SAMUEL EDWARDS,
Licenced Druggist,
18, King Street,
Southwark. *

PHARMACEUTICAL SOCIETY, VICTORIA.

A MEETING of the principal Chemists and Druggists of the city took place at the Mechanics' Institution on Friday evening, March 6, for the purpose of establishing a Pharmaceutical Society for Victoria, of a similar character to the one founded many years ago in Great Britain.

The Hon. J. Hood, M.L.C., was called to the chair, and briefly stated the objects of the meeting.

The secretary, Mr. Williams, read several communications, and the following report:

Report of the Committee appointed at a meeting of Chemists and Druggists, held at the house of Mr. Croad, Bourke-street, on the 16th ultimo:

In consequence of the various attempts that have been made of late to interfere, by legislative enactment and otherwise, with the Chemists and Druggists of this colony, it has been thought by many of the principal members of the trade in and around Melbourne and Geelong that an organisation should be instituted, for the purpose of protecting the trade generally, and also of elevating its character and position.

These ideas were, however, allowed to slumber until Dr. Tierney brought into the Legislative Council his "Poisons Bill," for the regulation of the sale and the safe keeping of all poisonous and deleterious drugs.

On the appearance of this bill the trade felt justly indignant that a measure likely to affect their interest so materially should have been introduced without any consultation, and accordingly met in considerable numbers at the house of Mr. Croad, and determined at once to send in a petition against the passing of such a crude and unnecessary measure. The petition was accordingly prepared and signed by every member of the trade in and around Melbourne and Geelong, and placed in the hands of the Hon. J. Hood, M.L.C., for presentation to the Council. A second meeting was held at the same place on the 16th ultimo, when your committee was appointed, consisting of Messrs. Croad, Williams, Blackett, Ford, Bosisto, Walton, Glover, and Lewis, for the purpose of waiting upon the members of the Legislative Council, and urging the necessity for the rejection of the "Poisons Bill" then before that House, and also to take the necessary steps for the formation of an association of Chemists and Druggists.

Respecting the first part of their duty, your committee have the pleasure to report that any lengthened opposition became unnecessary, as on the following day Dr. Tierney thought it most prudent to withdraw the bill, and the matter is now before a select committee of the Legislative Council, and it is believed that a considerable time will elapse before anything more will be heard about "The Poison Regulation Bill." Thus much for the first part of your instructions. And in coming to the subject of the formation of an association, your committee think that from what has already transpired, it is imperatively necessary that immediate steps be taken for the formation of an association which shall be in existence, and at all times ready to take action should any attempt be made to infringe upon the rights and privileges of Chemists and Druggists. The very fact of organisation existing will probably prevent the bringing forward any measure affecting the trade generally, without first submitting it for consideration to the council of the association.

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* Address unnecessary if placed on article sold.

Your committee would, however, desire to place the subject before you for consideration on higher grounds. Desirable as it is to be properly organised, that we may be in a position to repel unjust attacks, it is of greater consequence that we should have an organisation that will enable us to perfect ourselves in the art and science of pharmacy, afford opportunity and appliances for carrying out experiments, and be a means of increasing our knowledge and promoting our comfort. None need be ashamed to own that there is much yet to learn, and a wide field still open for profitable investigation.

Your committee would wish to refer you to the good that has resulted in England from the establishment of the Pharmaceutical Society of Great Britain; and, great as have been the results of its efforts, your committee are strongly of opinion that still greater good will arise from the proper organisation of a society, kindred in its character, for Victoria.

The benefits that might be enumerated are, in the first place, the elevation of the trade in character, proper instruction for apprentices that may hereafter come in, a registry for all competent assistants, and also the formation of a benevolent fund for any indigent or unfortunate members.

Should the society be established and properly supported, a library, museum, lecture-room, and laboratory should be instituted, and these alone would be worth all the trouble and expense that we might find it necessary to incur. By these means the young men and apprentices, and trade generally, would have a suitable place to resort, where they might spend their time in improving themselves in all that is essential for the proper discharge of their duties in the laboratory and shop.

Signed, on behalf of the committee,

G. H. WILLIAMS, Secretary.

It was moved by Mr. COOPER, seconded by Mr. DUNSTONE, "That an Association of Chemists and Druggists be now formed, to be called 'The Pharmaceutical Society of Victoria,' having for its object the advancement of pharmacy, by furnishing such a uniform system of education as shall secure to the profession and the public the safest and most efficient administration of medicine, and the uniting of its members into a recognised and independent body."

Mr. CROAD supported the resolution, and urged the propriety of establishing a pharmaceutical journal, as a medium through which the details of the operations of the society shall be made manifest.

Mr. BOWEN thought it was premature to attempt to follow too strictly the rules and regulations of the society of the mother country, and recommended that the society should "feel its way" before going into the entirety of the rules of the society of Great Britain.

The report was adopted.

The Honorary Secretary then read the rules of the proposed society, and it was unanimously resolved that the rules should be sent to each individual member. The rules read were those of the Pharmaceutical Society of Great Britain, which appeared to be fully adapted to the Victoria Society.

The CHAIRMAN thought that the rules were a little too extended to apply *in toto* to the requirements of the colony, and recommended that a court of examiners be appointed for the purpose of limiting the supply of admissions to the trade.

The resolution was unanimously carried.

Mr. FORD proposed "That the rules be referred to the provisional committee for revision, and that they should be further considered after being printed and circulated."

Mr. WRENTMORE seconded the resolution.

Mr. WILLIAMS thought the remarks of Mr. Bowen were not altogether correct, as he considered it would be highly necessary to lay the foundation of the society as broadly as possible, and that the sooner a museum was commenced the more perfect it would become.

Mr. Kingsland then proposed, and Mr. Plummer seconded, "That the following gentlemen be a provisional committee to carry out the foregoing resolutions, admit members, and disburse expenses: Messrs. Johnstone, St. Kilda; Archer, Thomas, Geelong; F. Cooper, Great Collins Street; French, William's Town; Croad, Blackett, Ford, Bosisto, Coulton, Glover, Lewis, and Williams.

A vote of thanks to the Chairman terminated the proceedings.—*The Melbourne Age*, March 7, 1857.

PEPSINE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—It would appear from the pamphlets and scientific papers on the subject of pepsin, or, as it is now termed, pepsine, that it is a discovery of recent invention. Will you therefore permit me the privilege of your valuable columns to prove the contrary to be the fact. It has been in use in the United States of America for many years, under the name of pepsin, and much good has been attributed to its effects.

Amongst the many eminent physiological chemists who have written on its merits, will be found Baron Liebig, in his work on *Animal Chemistry;* Dr. Coombe, on the *Physiology of Digestion;* Dr. Graham, on *Vegetable Diet;* the late Dr. Pereira, on *Food and Diet;* Dr. J. Draper, of New York University; Dr. Carpenter, Professor Silliman, Professor Dunglison, and many others.

Six years since I made experiments on the efficiency of the gastric juice of animals (which I made public in a paper I then published) as a substitute for that solvent in the human stomach, and found that the mucous membrane of the stomach of the calf yielded a more powerful pepsin than that of the sheep or the ox; which opinion is confirmed by some of the learned writers to whose works I have referred. As far as my own observations extend, I have no hesitation in saying that it will be found to form an artificial digestive medium, precisely analogous to the gastric juice, and furnishing a complete and perfect substitute for it; and that in those cases where a deficiency of its secretion is denoted, it will be found a remedy without an equal.

Should, therefore, any of your readers regard pepsin as a recent discovery, I trust these brief remarks will place them right.

I remain, yours most obediently,

Square, Barnstaple, May 6th, 1857. Henry Parker.

PATENTS FOR COATING PILLS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The two processes described in the last number of the *Pharmaceutical Journal* for coating pills, and introduced as something new, have both been the subjects of patents.

A patent for rendering pills tasteless by a coating of gelatine was granted to Mr. William Palmer many years ago—more recently I obtained a patent for coating pills with resinous gum. Any infringement of my patent is an act of dishonesty, and I shall seek redress in the Courts of Law.

I am, Sir, your obedient Servant,

Arthur H. Cox, Chemist, Brighton.

THE SALE OF POISONS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I take the liberty of addressing a few lines to you on the subject of the proposed Act for the Sale of Poisons, now in the House of Lords, to know whether any movement is being made by the trade in general to see that justice is done to us, and that we may not have a bungling piece of machinery made that it will be impossible to work; if any movement is making, I will cheerfully send up my contribution towards it. This colouring system, which our law-makers seem to think so clever, is simply absurd—here, in the country, arsenic is sold considerably; the man who has 1000 sheep may have his 10 lb. of arsenic uncoloured, but the man who has only 100 must have his coloured with the black or blue. Need I tell you that the farmers won't have their wool dyed gratuitously, and we sell the arsenic white and genuine. Now, as regards the new Act, how are we to colour nux vomica. Some of these very wise heads will be ordering their grooms to get their hunters ready, and to see that the boot-tops, saddles, &c., are all clean; but if the oxalic acid is sent according to their order, will they not be rather surprised to see their grooms with blue tops smiling at their own blue stockings? Take the straw trade—what colour shall we have our women's bonnets, hats, &c.? It can never be sold but as pure oxalic acid. I believe I only express the feelings of the whole trade. The ironmonger sells "driers" in the shape of plumbi acetas, zinci sulphas, &c., with impunity, not even labelled! Was the idea of taking a man's business away from him on a second conviction, obtained from Russia? Certainly 'tis new to English ears. How many dozens of pennyworths of white precipitate are sold by every Druggist in the course of the year? Are the poor people to be sent to the parson of the parish (our rector lives two miles off) to get a certificate that the poor woman merely wants to kill "bobs" in her children's heads. In Dunstable and Luton there are *tons* of oxalic acid annually sold, so also of salt of sorrel.

Your obedient Servant,

Petersfield, 25th May, 1857. HY. NICHOLS.

WE have received the following extract from a newspaper, with comments from a correspondent:—

SUICIDE.

"Yesterday, Mr. C. Jewison, the coroner, held an inquest at the Fox and Hounds Inn, Bradford, touching the death of James Hustler. The deceased, who was thirty-six years of age, resided in Jury Street, North-wing. He had been unwell and in a desponding state of mind for some time. Yesterday morning, about seven o'clock, while his wife was employed at a mill, a young woman discovered him suspended by the neck in the staircase of his dwelling. Some neighbours who were called in cut him down. The jury returned a verdict that the deceased had hanged himself while in a state of temporary insanity."

Please to read the enclosed and consider the importance of obtaining an Act of Parliament to prevent persons selling [rope! or stockings! unless the buyer has obtained a certificate from a priest or medical man, or is accompanied by a sane person! of mature age! Also to have all persons buying cutlery! watched, and if found to feel the sharpness of that cutlery, to have them immediately brought before a magistrate, and if not able to give a good account of themselves, to send them to a lunatic asylum forthwith. Also all persons buying firearms to be provided with a certificate from a priest or medical man to the effect that they do not intend to make an improper use of them. Also all persons found walking alone! near the sea or a river, or on a mountain or any precipitous place, to be immediately brought before a magistrate, and if not able to give a good account of themselves, to be sent to a lunatic asylum! That sane priests and medical men be appointed at £2000 per annum to give certificates, &c.; also a larger number of magistrates at the same sum; that grants be made to build lunatic asylums to any extent that may be required. That the person bringing in the Bill to regulate the Sale of Poisons be examined, and if found to have common sense? to be set at liberty; if not, to have his house searched, and if any of the before enumerated articles be found, and he not able to give a good account of himself, that he be taken care of immediately, until an asylum of sufficient magnitude be built to receive him.

SUICIDE FROM MORPHIA.

ON Monday, May 11th, Mr. W. J. Payne held an inquest at the Spotted Dog, Strand, respecting the death of Mr. George Fife, aged 50, who, it was stated, was a medical gentleman of some eminence at Birmingham, and was brother to Sir John Fife. The deceased was a member of Queen's College, and professor of Materia Medica. It was proved in evidence that on Friday evening the deceased went to the shop of Mr. Burfield, chemist, Norfolk-street, Strand, and asked for some morphia, which he said he took in small doses to procure sleep. Mr. Burfield's assistant gave the deceased some morphia in a phial, but said he should not have done so if he had not known him to be a medical man. A tonic medicine was also sold to the deceased at the same time. The deceased went to the Strand Theatre on Friday night, and when he returned home to his lodgings in Surrey-street, Strand, he appeared to be in an *excited* state from drink. Next morning he was found dead in bed. A surgeon who was called in said the deceased undoubtedly died from the effects of morphia, and that, presuming the bottle which had contained it had been full, there was enough to kill four persons. According to one witness, the deceased had said that family matters preyed upon his mind. The jury returned a verdict "That the deceased died from an over-dose of morphia, he being at the time in a state of intoxication, but that he had no intention of wilfully destroying his life."

POISONING BY MISTAKE.

TO THE EDITOR OF THE TIMES.

SIR,—A few weeks ago I directed public attention through the medium of your columns to the danger of "children's balloons" in consequence of their being inflated with hydrogen gas. Permit me now to say a few words on a danger of a different kind—viz., the liability, under the present lax state of the law, of swallowing a dose of poison in mistake for medicine.

The following narrow escape has just occurred in this city:—A lady was ordered by her medical attendant to take two teaspoonfuls of the tincture of rhubarb, and the usual bottle was returned to the druggist for the purpose of being refilled. The master of the shop was absent, and a boy, left in charge, supplied the demand by pouring inadvertently the tincture of opium (laudanum) into the bottle labelled "Tincture of rhubarb;" and nearly two teaspoonfuls of this narcotic poison, instead of the prescribed medicine, had already reached the lips of the patient, when her sister's attention was excited by the colour, and the mistake was discovered. Had the dose been swallowed, no human skill could, under the peculiar circumstances, have saved the lady's life.

I am aware that legislative measures are in contemplation to meet the danger that arises from boys, or incompetent men, being allowed to dispense poisonous drugs. The publication of facts bearing on this important subject may accelerate the movement. It is full time that a remedy was provided against the recurrence of the danger; and, let me add, that in Scotland, where there are no coroners' inquests to search into the causes of accidental death—a deficiency greatly to be deplored—the most stringent measures ought to be adopted to regulate the sale of poisons.

I remain, Sir, your obedient servant,

Glasgow, May 18. M.D.

CARELESSNESS IN THE SALE OF POISONS.

AN inquest was held on Monday last at Louth, on the body of a child aged two years and five months, named Charles Houseman, son of Samuel Houseman, a gardener. It appears that a phial of laudanum was left by Houseman upon a table, and that the child drank a portion of it, and was found in a state of stupor. It died the same night. The man who sold the poison was a grocer, who keeps it for the "accommodation" of the public, but does not even label the bottles. The coroner said to this man—"If death had resulted to an adult person you would have been placed in a most perilous position. Not only have you neglected to place a label on the phial describing the contents as poison, but you allowed it to go out of your shop with a label upon it describing the contents to be 'Dalby's Carminative,' a harmless mixture. You see it is now upon the bottle. In this case, however, the deceased child was so young that it could not read, but had it been otherwise you would have been placed in an awful position. I would recommend you to be careful." The jury, after a short consultation, returned a verdict of "Accidental death."—*Times*, May 23.

BOOKS RECEIVED.

TRANSACTIONS OF THE MEDICAL AND PHYSICAL SOCIETY OF BOMBAY, *for the Years* 1855 *and* 1856. Bombay: Printed at the Bombay Education Society's Press, 1857.

A MANUAL OF PHOTOGRAPHIC CHEMISTRY, *including the Practice of the Collodion Process*. By T. FREDERICK HARDWICH, Lecturer on Photography in King's College, London, &c. Fourth edition. London: John Churchill, New Burlington-street, 1857. (From the Author.)

ON THE CONSTITUTION OF ALLOPHANE. By AUGUSTUS BEAUCHAMP NORTHCOTE, F.C.E., &c. 1857. (From the Author.)

GOD IN DISEASE; *or, the Manifestations of Design in Morbid Phenomena*. By JAMES FOULIS DUNCAN, M.D., &c. Second edition. London: James Nisbet & Co., Berners Street. Dublin: George Herbert. 8vo, pp. 323. 1857.

TO CORRESPONDENTS.

W. M. H. (Dublin).—As the Pharmacy Act does not apply to Ireland, the Society has no power to prevent the use of the title "Pharmaceutical Chemist" by unqualified persons in that part of the kingdom.

J. T. (York).—(1.) *Oil of Tobacco:* see vol. iii., p. 342; and Pereira, *Mat. Med.*, p. 1426. (2.) The examinations in Botany are conducted according to the natural system.

W. E. (London).—When Liquor Antimonii Tartarizati is ordered, we think Vinum Antimonii Potassio-tartratis is generally intended; but it would be more correct to use the former, which is still retained in the Dublin Pharmacopœia.

M. P. S. (Bristol) should apply, by letter, to Professor Morton, Veterinary College, Camden Town.

G. W. (Derby).—Lindley's *School Botany*, price 5*s.* 6*d.* Bradbury & Evans.

Dolor (London).—The label referred to is scarcely liable to the stamp duty, but is sailing very near the wind.

W. P. (Liverpool).—Hooper's *Medical Dictionary*, last edition.

C. T. E.—*Coating of Pills:* see p. 546 of our last number.

Verus (Liverpool).—In the mixture alluded to, the addition of mucilage is necessary to prevent the separation of the balsams.

A. B. C.—It would be invidious to answer such a question in this journal.

T. P. (Cork).—The specimen of quackery has been received.

A Member, who signs himself "One who desires to expel those who do any act unbecoming their position," wishes to draw attention to the fact, that some Members of the Pharmaceutical Society make use of a "halfpenny newspaper" as an advertising medium.—[We cannot quite see how the price of the newspaper affects the question.]

Mr. Kernot (Poplar) and *Mr. Rook* (Sittingbourne) are thanked for their enclosures.

Delta (London).—The *Journal de Pharmacie et de Chimie* is published under the direction of a committee of sixteen Chemists. It may be obtained through Messrs. Williams & Norgate, Henrietta Street, Covent Garden.

A. Z. (London).—(1.) *Bastick's Medicated Cod Liver Oil*, vol. xiv., page 427. (2.) No.

A Student (Evesham).—(1.) The work is useful to a beginner. (2.) In some cases.

J. W. (Cork).—The specimen of Bark sent to us is "Quillaia saponaria," native of Chili. See *Chemical Gazette*, vol. ii., p. 216.

Mr. Turner, Mr. Large, Mr. Rimmington, Mr. Southall, and several other correspondents, some of whom have been answered by post, have written on the subject of the Poison Bill.

A. P. S.—There is nothing remarkable in the extract. Judging from its appearance, we should say it is of average quality.

Mr. Tuff (Enfield).—There was no opportunity of reading the letter at the meeting. One of the subjects was discussed; the others have not been overlooked.

W. J. (Manchester).—Jeremie's solution of opium is a quack medicine, of which we have no formula.

Botanicus (March).—(1.) Normandy's *Agricultural Chemistry.*—(2.) We know of no work (arranged according to the Linnean system) answering to the description given. Lindley's *Vegetable Kingdom* is the best work.

R. E. (Huddersfield), *M. P. S.* (Glasgow).—We are unable to give the information.

ERRATA.—Page 541, line 14 from bottom, *for* De Vallenger, *read* De Valangin.—Page 572, line 4, *for* 3 lbs. of salt to one of flowers, *read* 1 lb. of salt to 3 of flowers. This error was corrected by Mr. Haselden in the number following that in which his paper appeared.

Instructions from Members and Associates, respecting the transmission of the Journal, to the Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd) to Mr. CHURCHILL, New Burlington Street. Other communications to the Editor, 15, Langham Place.

INDEX.

PAGE

Accidental Death from Laudanum.. 485
———— Poisoning—Extraordinary Case of Life Saved 389
———————— by Prussic Acid 484
Accidents from Poison, &c., Precautions against 347
Acetate of Morphia, Solution of, Decomposition of (E. Wood)...... 531
Acid, Carboazotic, Medicinal and Physiological Action of (F. C. Calvert and Dr. Moffat)............ 167
—— Chromic, and the Volatile Oils, Mutual Action of (J. T. Plummer)............................... 130
—— Gallic, Means of Preserving Solution of 223
—— Molybdic, Preparation of...... 567
—— Phosphoric, Estimation of...... 431
—— Sulphuric, Poisoning by 288
—— Uric, Decomposition of in the Animal Organism 377
Acids in Coloured Liquids, Estimation of 429
—— Organic, in Mineral Waters ... 475
—— Tartaric and Citric, Production of...................................... 430
Aconitum Heterophyllum, Root of, Letter on (T. Thomson)............ 311
Act, Apothecaries', Proceedings under..................................... 105
Adulterated Pepper, Fine for Selling 199
Adulteration of Butter 577
———— of Calamina Præparata (E. Wood) 388
———— of Drugs, Report of a Committee relative to (America) 145
———— of Food, Drugs, &c., Report of the Select Committee of the House of Commons on...... 185
———— of Food, Drugs, &c., Results of the Parliamentary Inquiry 153
Agar-Agar 44
Alcohol, Purification of 330
Alizarine Ink, Preparation of 379
Alkalimetric Solution, Preparation of.. 476
Alleged Poisoning by Antimony ... 147
Allotropism of Selenium............... 169
Aloine (T. B. Groves).................. 128

PAGE

Alum in Bread (R. Reynolds) 558
———— Letter on (F. M. Rimmington) 611
———— Report of Dr. Gibbon's Relative 559
—— Chinese.............................. 32
—— Detection of, in Bread 557
—— Genuine Bread without......... 556
—— Action of, upon Red Wines, &c. 43
Aluminium, Sodium, Chloride of Aluminium, &c., Preparation of, *with cut* (M. Deville) 34
American Drugs presented to the Pharmaceutical Society by W. Procter, Jun., Succinct Description of 268
——— Pharmaceutical Association:
Report of the Committee on Standards for Drugs 144
Report of a Committee to consider and report on the subject of Adulterations 145
Ammonia (Dr. A. W. Hofmann) ... 224
——— Law of Absorption for ... 374
——— Poisoning by 579
——— Preparation of............... 223
Amoma of Western Africa, *with cuts* (W. F. Daniell)............465, 511
Amyle, Hydride of (T. & H. Smith) 604
Amylene, a New Anæsthetic Agent 427
Anæsthesimeter, Duroy's, *with cut* (E. Wood).............................. 274
Analysis of Milk 135
—— Volumetric 432
Angular Bottles and Pots ordered in the Dublin Pharmacopœia...... 289
Anniversary, Approaching, of the Pharmaceutical Society 539
Another Thing Forgotten (J. R. Collins).................................. 382
Answers to Correspondents, *see* Correspondents, Answers to
Antimony, Equivalent of 171
——— Iodide of 402
——— Poisoning by 197
———————— Alleged......... 147
——— Slow Poisoning by (Dr. Nevins).................................. 415
Apothecaries' Act, Proceedings under 105

PAGE

Apothecaries, Society of, *v.* Broadbent 106

Apprentices, Education of, Letter on 386

———————— and Apology for Assistants (R. W. Giles) 387

———————— Registered, List of, *see* Registered Apprentices, List of

Appointment of Pharmaceutist to the Bristol Royal Infirmary 147

Archer, T. C., Penghawar Djambi, the New Styptic 322

———— Useful Products of the Natural Order Leguminosæ 459

Arsenic and Antimony, Detection of 377

———— Poisoning by, in China ... 532

———————— in Ireland... 578

———— Preparations of, Employed in Medicine (A. F. Haselden) ... 541

———— Unsuccessful Attempt to Poison a Husband by 196

Arsenici Iodidum........................ 541

Austrian Pharmacy, Extracts from (J. Ince) 571

Baildon, H. C., Improved Method of Coating Pills.......................... 546

Bark, Red Cinchona, Tree Producing, *with cut* (J. E. Howard)... 207

Barks, Cinchona, Microscopical Examination of (H. S. Evans) 553

Barling, T., Letter on the case of poisoning at Weymouth............ 246

Barytes, Hydrate of, Crystallized (F. Mohr) 309

Bastick, W., Detection and Quantitative Estimation of Quinine and other Alkaloids when combined with Fatty Oils........................ 277

Beberine, or Yellow Dye Tree of Soudan, *with cut* (W. F. Daniell) 398

Beet-root Sugar 248

Belladonna, Root of, Poisoning by (E. Hollier) 579

Bentley, R., Characters of Dandelion Root, and means of distinguishing from other Roots (*with cut*) 304

Berry, G. R., Dry Collodion Processes 602

Bessemer, W., Manufacture of Iron and Steel without Fuel 182

Bill, Medical, for 1857.................. 441

—— Sale of Poisons 616

Black Drop, Accidental Poisoning by 246

———————— Letter on, (T. Barling) 246

Black Ink 568

Bone, Solubility of, in Water......... 142

Books, Notices of, *see* Reviews

Botanical Prize.......................... 2

PAGE

Botany, Inducements offered by the Pharmaceutical Society for the Study of............................... 494

———— of the Crimea (W. A. Moss).................................... 163

———— and Materia Medica, Questions for Examination in............ 267

Bottle, Washing, Self-acting 475

Bottles and Pots, Angular, ordered in the Dublin Pharmacopœia...... 289

Boy Dispensers........................... 445

Bradford County Court:

Society of Apothecaries *v.* Broadbent 106

Bread, Alum in (R. Reynolds) 558

———————— Letter on (F. M. Rimmington) 611

——— Detection of Alum in......... 557

——— Use of Alum in making, Dr. Gibbon's Report relative to 559

——— without Alum, Genuine...... 556

Brewer, J. W. N., Letter relative to Pharmacy in the Crimea 47

Bristol Royal Infirmary, Appointment of Pharmaceutist to, Letter on (W. Trenerry)..................... 147

British Association for the Advancement of Science, Twenty-sixth Meeting of (Cheltenham) 176

Broome, S., London Vegetation *v.* London Smoke 146

Brown, D. R., Effects of Sweet Spirit of Nitre when Inhaled............... 455

Brucia, Strychnia, &c., Testing for (J. Horsley) 177

Brucia and Strychnia, Method of Extracting from Nux Vomica without Alcohol (J. Horsley)...... 179

Business, Druggist's, Raffle for 48

Butter, Adulteration of 577

Calamina Præparata, Adulteration of (E. Wood)........................... 388

Calvert, F. C., and Dr. Moffatt, Medicinal and Physiological Action of Carboazotic Acid.................. 167

Camphine 248

Camphor an Antidote to Strychnia 486

Candidates who have passed the Major and Minor Examinations, *see* Examinations, Major and Minor, Candidates who have passed.

Caoutchouc, Vulcanized............... 331

Carboazotic Acid, Medicinal and Physiological Action of (F. C. Calvert and Dr. Moffatt) 167

Carbonic Oxide........................... 174

Cardamoms, Siam....................... 556

Case of Imposition 199

PAGE
Catechu and its Acids (C. Neubauer) 39
Caustic, Preparation of, with Gutta Percha ... 567
Cement, Caseine ... 223
——— ——— (R. Wagner) ... 288
Charcoals, Decolourizing, and their Power of Absorbing some of the Gases (J. Stenhouse) ... 363
Chemical Compounds, Discrepancies of the Equivalents of ... 536
——— History of the Fats... 41
——— and Physical Investigations, Results of, and Applications of Physics and Chemistry in the Arts (B. H. Paul) 168, 215, 327, 374, 429, 475, 565, 607
For detail of articles, *see* Paul, B. H., Report of Chemical and Physical Investigation.
Chemical Relations of the Halogens 566
——— Tests for Strychnia (W. Copney) ... 23
——— Type: Ammonia (A. W. Hofmann) ... 224
Chemistry and Pharmacy, Questions for Examination in ... 267
Chemists, Pharmaceutical, Privileges of ... 587
Chinese Alum ... 32
——— Green Dye, Manufacture of (Rev. M. Hélot)...517, 553
Chromate of Potash and Sulphuric Acid, Testing of various Organic Substances by (M. Eboli) ... 140
Chromic Acid and the Volatile Oils, Mutual Action of (J. T. Plummer) 130
Cinchona Bark, Red, Tree producing, *with cut* (J. E. Howard)... 207
——— Barks, Microscopical Examination of (H. S. Evans) ... 553
Circulation of Sap (Mr. Grundy) ... 355
Coal Gas, Effects of the Presence of Sulphur in (F. W. Griffin)...166, 323
Coal Gas, Effects of the Presence of Sulphur in (L. Thompson)...286, 379
Coal, Tissue found in, Microscopical Examination (J. T. Tupholme)... 454
Coating Pills, new Method of (H. C. Baildon) ... 546
Cobalt Green ... 223
Cælocline Polycarpa, Yellow Dye Tree of Soudan, *with cut* (W. F. Daniell)... 398
Coffee, Adulteration of, with Vegetable Substances, Detection of (Prof. Graham, Dr. Stenhouse, and D. Campbell)...228, 521
College of Dentists of England, Council and Officers of ... 390
——— ——— Inaugural Meeting of 486
Collins, J. R., Another Thing Forgotten... 382
Colchicine, Pre-existence of in the Seeds of Colchicum (G. Oberlin) 529
Colour Substance of Monarda Didyma ... 476
Colours, Lake ... 330
Combustion, Spontaneous (?)...198, 243
Committee, Pharmacopœia, *see* Pharmacopœia Committee
——— Select, of the House of Commons, Report on Adulterations ... 185
Composition of Wheat Grain, its Products in the Mill, and Bread (J. B. Lawes and J. H. Gilbert)... 561
Conservation of Force, Lecture on (Prof. Faraday) ... 533
——— ——— (G. Hamilton) 551
Consumption of Soap ... 567
Conversazioni ...354, 589
Copals of Western Africa, *with cut* (W. F. Daniell)...367, 423
Copney, W., Chemical Tests for Strychnia ... 23
——— Meteorological Report...432, 479
Copper, Estimation of... 176
——— Production of, from its Ores, &c. &c. (N. Samuelson) ... 509
Coral Tooth Paste ... 48
Correspondents, Answers to, 48, 152, 199, 248, 295, 344, 392, 439, 488, 536, 584, 624
Cotton, Detection of, in Woollen Fabrics ... 476
——— Seed, Oil of (Mr. Wayne) ... 334
Coumarine, Preparation of... 173
Council, Election of, for 1857-58 ... 599
Council of the Pharmaceutical Society, Meetings of:
Election of Officers of the Society 12
Members of Council who remain in Office by Lot for the ensuing Year ... 496
Council of the Pharmaceutical Society, Report of: Financial Statement, &c. ... 593
Council of the Pharmaceutical Society on the Education of Dispensers of Medicine and the Sale of Poisons ... 263
Court of Queen's Bench, Guildhall—Crane *v.* Voules ... 148
Cox, A. H., Letter on Patents for Coating Pills... 621
Cruel Experiments ... 158
Crystalline Form, &c., of Selenium and Iodine... 375
Crystallization (W. H. Samuel)... 459
Crystals, Cleavage of, and Slate Rocks, Lecture on (J. Tyndall) 192, 237
Curtis, F., Letter on Liquor Cotyledonis Umbellici ... 143

PAGE

Cyanogen Compounds, Production of (*with cut*) 218
——— Presence of, in Carbonate of Soda 223

Dammar 44
Dandelion Root, Characters of, and Means of Distinguishing from other Roots, *with cut* (R. Bentley) 304
Daniell, W. F., Cælocline Polycarpa, the Beberine or Yellow Dye Tree of Soudan (*with cut*).................. 398
——— Amoma of Western Africa (*with cuts*) 465, 511
——— Copals of Western Africa (*with cuts*) 367, 423
——— Egusé Oil, a New Vegetable Product from Western Africa.................................. 307
Death from Laudanum, Accidental 485
Decolourizing Charcoals, and their Power of Absorbing some of the Gases (J. Stenhouse) 363
Dental Profession, Observations on 301, 352, 396, 443
Density of Solids, Method of Estimating 374
Dentists of England, College of—Council and Officers of 390
——— Inaugural Meeting of........... 486
Dentists, Society of, Public Meeting of.. 343
Desiccated Milk, Grimwade's......... 354
Detection of Strychnia when administered in doses less than sufficient to cause death.................. 541
Deville, M., Preparation of Aluminium, Sodium, &c. (*with cut*)...... 34
Dispensers, Boy, Observations on... 445
——— of Medicine, Education of, the Council of the Pharmaceutical Society on...................... 263
Dispensing of Medicine in the Army 348
Distilled Waters of the Pharmacopœias (A. F. Haselden) 14
Distribution of Prizes.................. 266
Donations to the Library and Museum of the Pharmaceutical Society....................12, 266, 304, 446
Donation to the Museum of the Pharmaceutical Society by W. Procter, jun.......................... 152
Dove's Confession 198
Drain Pipes, means of Preventing the Stoppage of 378
Druggist's Business, Raffle for 48
Drugs, Adulteration of, Report of a Committee to consider and report on (American) 145

PAGE

Drugs, American, Collection of, presented to the Pharmaceutical Society by W. Procter, jun., Succinct Description of 268
——— Food, &c., Adulteration of, Result of the Parliamentary Inquiry, Remarks on 153
——— Inspection of, at the Port Baltimore, Report of 338
——— Standards for, Report of the Committees on (American) 144
Dry Collodion Processes (G. R. Berry) 602
Dublin Pharmacopœia, Angular Bottles and Pots ordered in 289
——— Supplement to (J. Grattan)......................... 289
Duroy's Anæsthesimeter, *with cut* (E. Wood).............................. 274
Dye, Green, Chinese, Manufacture of (Rev. M. Hélot) 517, 553
——— Note on (D. Hanbury) 213
Dye Pigment, Preparation of, from Quercitron Bark 565
Dyes from Guano......................... 248

Early Closing Movement, Letter on 242
Eboli, M., Testing of various Organic Substances by Chromate of Potash and Sulphuric Acid.................. 140
Edible Birds' Nests 44
Education of Apprentices—Apology for Assistants (R. W. Giles)...... 387
——— Letter on 386
——— of Dispensers of Medicine and the Sale of Poisons, the Council of the Pharmaceutical Society relative to 263
Educational Functions of the Pharmaceutical Society 492
Edwards, J. B., Lecture on Strychnia, Notice of 26
——— General Properties of the Rivington Water 600
Egusé Oil, a new Vegetable Product from West Africa (W. F. Daniell) 307
Election of Council for 1857-58...... 599
Electro-Chemical Engraving......... 337
Elementary Substances, Specific Heat of................................. 168
English Oak Galls (Dr. Vinen)...... 137
Erythrophyleum Judiciale, the Sassy Bark Tree of Cape Palmas, *with cuts* (W. Procter, jun.) 233
Essence of Rennet 199
Evans, H. S., Microscopical Examination of Cinchona Barks 553
——— Pharmaceutical History of the White Poppy and Opium 359

PAGE
Examination, Major, Candidates who have passed 119, 266, 353, 446, 496, 540
———— Minor, Candidates who have passed 119, 266, 353, 446, 496, 540
Existence of Silver in Sea-Water (F. Field) ... 614
Experiments, Cruel ... 158
Explosive Action of Sodium on Water (F. W. Griffin) ... 141
Extract of Belladonna, Poisoning by (H. Hopley) ... 291
——— of Liquorice ... 403
———— Taraxacum, Lactic Acid in 172
Extracts from Austrian Pharmacy (J. Ince) ... 571

Faraday, Prof., Conservation of Force, Lecture on ... 533
———— M. Petitjean's Process for Silvering Glass, &c., Lecture on 149
Fat, Separation of from Soap-suds, &c. ... 429
Fats, Chemical History of ... 41
—— and Oils, Treatment of ... 332
Felspar, Substitute for, in the manufacture of Porcelain ... 476
Ferricyanide of Potassium, Formation of ... 172
Ferrocyanides, Production of ... 331
Ferruginous Cement ... 608
Ferrum Reductum, Preparation of .. 565
Field, F., Existence of Silver in Sea-Water ... 614
Financial Statement for 1856...495, 593
Florida Indigo ... 337
Fly Papers ... 278
Formic Acid, Production of ... 174
Fossil Vegetation of the Coal Measures (T. Greenish) ... 507
French Pharmaceutical Specialities, Notice of some (D. S. Kemp).... 545
Fresh Meat, Preservation of (G. Hamilton) ... 17

Galena and Sulphide of Antimony, Assay of ... 176
Gas, Coal, Effects of the Presence of Sulphur in (F. W. Griffin) 166, 323
———— (L. Thompson) 286, 379
Genuine Bread without Alum ... 556
Getah Percha ... 43
Giles, R. W., the Education of Apprentices—Apology for Assistants 387
———— Practical Examination of the Quinine Salts ... 22
Glass, Silvering and Gilding ... 138
Glover's Patent Enamel Photographs ... 590
Glycerine, Ioduretted, in Skin Diseases ... 336

PAGE
Gold in the Form of Malleable Sponge ... 476
—— and other Metals, Relations of to Light ... 568
Goodhall's Patent Grinding and Levigating Machine ... 33
Gore, G., Position of Sodium in the Thermo-Electric Scale ... 321
Graham, Stenhouse, and Campbell, Detection of the Adulteration of Coffee with Vegetable Substances 228, 521
Grattan, J., on the Supplement to the Dublin Pharmacopœia ... 289
Green, Cobalt ... 223
Green Dye, Chinese, Manufacture of (Rev. M. Hélot) ...517, 553
———— Note upon (D. Hanbury) 213
Greenish, T., Fossil Vegetation of the Coal Measures ... 507
Griffin, F. W., Effects of the Presence of Sulphur in Coal Gas, 166, 323
——— Explosive Action of Sodium on Water ... 141
Grimwade's Desiccated Milk ... 354
Grinding and Levigating Machine, Goodhall's ... 33
Groves, T. B., Aloine ... 128
Grundy, Mr., Circulation of Sap ... 355
Guano, Jamaica, Analysis of ... 488
Guarana, Determination of the Amount of Theine in (J. Stenhouse) ... 212
Guibourt, M., Note on Wood Oil ... 332
Gutta Percha, Solution of (J. M. Maisch) ... 142

Halogens, Chemical Relations of ... 566
Hamilton, G., Conservation of Force 551
——— Letter relating to Strychnia 20
——— Preservation of Fresh Meat 17
Hanbury, D., Note upon a Green Dye Tree from China ... 213
———— Penghawar Djambi, a New Styptic ... 278
———— Storax ...517, 461
Haselden, A. F., Distilled Waters of the Pharmacopœias ... 14
———— Preparations of Arsenic employed in Medicine ... 541
———— There is no Time ... 384
Hélot, Rev. M., Manufacture of the Chinese Green Dye ...417, 553
Hemlock, Water, Root of, Poisoning by ... 578
Higginbottom, J., Unguentum Hydrargyri ... 214
High Temperatures, Production of (*with cuts*) ... 215
Hollier, E., Poisoning by the Root of Belladonna ... 579

PAGE

Hopley, H., Two Cases of Poisoning: Oil of Bitter Almonds, Extract of Belladonna 291
Horsley, J., Experiments on Animals with Strychnia, and the Probable Reasons for its Non-Detection in certain Cases 179
———— Method of Extracting Brucia and Strychnia from Nux Vomica without the use of Alcohol 179
———— New Method of Instituting Post-Mortem Researches for Strychnia 181
———— Testing for Brucia, Strychnia, &c. 177
Howard, J. E., Tree producing Red Cinchona Bark (*with cut*) 207
Human Life, Pecuniary Value of... 532
Hydrate of Barytes, Crystallized (F. Mohr) 309
Hydraulic Mortar 378
Hydride of Amyle (T. & H. Smith) 604
Hydrochloric Acid, Influence of, on the Formation of Sulphides 174

Ice, Production of, by the Evaporation of Ether in Vacuo (*with cuts*) 477
Illegal Weights:
The Westminster Stamp and Westminster Law 108
Imposition, Case of 199
Ince, J., Autobiography of Matthew Robinson 580
———— One Thing Forgotten...... 319
Income Tax, the: its Pressure upon Professions and Trades 395
Indian Materia Medica 577
Indigo, Florida........................... 377
Ink, Alizarine, Preparation of 379
—— Black 568
—— Writing, in Cakes 531
Inspection of Drugs at the Port Baltimore, Report of 338
Iodide of Antimony..................... 402
———— Potassium, Preparation of 608
Iodine, Testing for in Water 174
Ioduretted Glycerine in Skin Diseases 336
Iron, Manufacture of (S. Macadam) 356
—— Production of 327
—— Sesquioxide of, used in Medicine.. 452
—— and Steel, Manufacture of without fuel (W. Bessemer) 182
Ivory Balls, to stain red 440
—— and Bone, Method of Imparting a Red Colour to (J. C. Kellermann) 531

Jamaica Guano, Analysis of 488
Jockey Club Bouquet, Formula for 488

PAGE

Jurisprudence, Medical and Pharmaceutical............................. 537

Kellermann, J. C., Method of Imparting a Red Colour to Bone and Ivory 531
Kemp, D. S., Notice of some French Pharmaceutical Specialities 545
Knight's Soda-Water Apparatus for Aerating Liquids (*with cuts*) 543
Kops, G. F. de Bruyn, Note on some of the Productions of the Rhio-Lingga Archipelago................. 43

Lactic Acid in Extract of Taraxacum 172
Lake Colours 331
Laudanum, Accidental Poisoning by 195
———— Death from 485
———— Attempted Suicide by 292, 341
———— and Oil of Bitter Almonds, Suicide by 341
———— Suicide by 340
Lawes, J. B., and J. H. Gilbert, some Points in the Composition of Wheat Grain, its Products in the Mill and Bread 561
Leaders:
The Registers of the Pharmaceutical Society 1, 105
The Botanical Prize 2
The Last Edition of the Medical Bill for Session 1856 3
Palmer's Trial and the Result ... 5
Proceedings under the Apothecaries' Act.............................. 105
Illegal Weights—The Westminster Stamp and Westminster Law 108
Progress of Pharmacy in Birmingham 109
Limited Liability Mania 110
The Leeds Poisoning Case......... 115
Sale of Poisons.......................... 117
Adulteration of Food, Drugs, &c.—Results of the Parliamentary Inquiry 153
A Licence in Pharmacy 156
Cruel Experiments 158
A Passing Sketch of the State of Pharmacy in France and Great Britain—The Licence in Pharmacy 201
Pharmacy in Italy—The Limitation of the number of Shops—The Sale of Poisons................. 205
Medicine and Pharmacy in Switzerland 249
Legislation against Poisoning ... 254
Sale of Poisons 256
Rising Generation of Pharmaceutists 261

PAGE

- Leaders:
  - Pharmacy in America 297
  - Studious Habits — The Experiment 300
  - The Dental Profession 301, 352, 396, 443
  - The Student's Grievance 345
  - Precautions against Accidents from Poison, &c. 347
  - Dispensing of Medicine in the Army 348
  - Professional Responsibility 393
  - The Income Tax—its Pressure upon Professions and Trades... 393
  - The Medical Bill for 1857 441
  - Boy Dispensers 445
  - Poor-Law Medical Relief 489
  - Educational Functions of the Pharmaceutical Society 492
  - Botany 494
  - Medical and Pharmaceutical Jurisprudence 537
  - The Approaching Anniversary of the Pharmaceutical Society ... 539
  - Legislation against Poison, Remarks on 585
  - The Privileges of Pharmaceutical Chemists 587
- Leeds Poisoning Case, Remarks on 116
- Legislation against Poisoning 254
- ——— Poison, Remarks on 585
- Leguminosæ, Natural Order, useful Products of (T. C. Archer) 459
- Library of the Pharmaceutical Society, Donations to, *see* Donations to the Pharmaceutical Society.
- Licence in Pharmacy 156, 201
- Limited Liability Mania........ 110
- Lindley, J., Sassy Tree of Western Africa 373
- Liquidamber Styraciflua (C. W. Wright)........ 336
- Liquor Arsenici Chloridi 541
- ——— Cotyledonis Umbellici, Letter on (F. Curtis) 143
- ——— Potassæ Arsenitis 541
- ——— Sodæ Arseniatis 541
- ——— Taraxaci 536
- Liquorice, Extract of 403
- List of Members, Associates, and Apprentices, *see* Members, &c., List of
- Liverpool Chemists' Association:
  - Annual Dinner 284
  - Annual Meeting 281
  - Award of Prizes for an Essay "On the Application of the Microscope to Pharmacy"...... 283
  - Conservation of Force (G. Hamilton) 551

PAGE

- Liverpool Chemists' Association:
  - Conversazione 359
  - Crystallization (W. H. Samuel)... 459
  - Donations to the Library and Museum 283, 318, 359, 417, 458, 509, 550, 600
  - Dry Collodion Processes (G. R. Berry) 602
  - Election of Members 20, 283, 318, 359, 417, 458, 509, 550, 600
  - Glass Staining (J. A. Forrest) ... 318
  - Letter from G. Hamilton, Esq.... 20
  - Metallic Arsenic obtained from the Tissues of the Body in Arsenical Poisoning 417
  - Microscopical Examination of Cinchona Barks (H. S. Evans) 553
  - Opening Address by the President 283
  - Opening of the Chemists' Museum 361
  - Pharmaceutical History of the White Poppy and Opium (H. S. Evans) 359
  - Preservation of Flesh Meat (G. Hamilton)........ 17
  - Production of Copper from its Ores, &c. (N. Samuelson) 509
  - Products of the Natural Order Leguminosæ (T. C. Archer) ... 459
  - Report of Council, &c........ 281
  - ——— on the General Properties of the Rivington Water (J. B. Nevins and J. B. Edwards) 600
  - Sale of Poisons (T. Lowe) 509
  - Slow Poisoning by Antimony (Dr. Nevins)........ 415
  - Strychnia, Lecture on (J. B. Edwards) 20
- Liverpool Museum of Applied Science 342
- London Vegetation *v.* London Smoke (S. Broome) 146
- Lowe, T., Sale of Poisons 509

- Macadam, S., Manufacture of Iron... 356
- ——— Strychnia, Lecture on... 120
- ——— Supplement to Lecture on Strychnia........ 163
- Macdonald, J. D., Sea Saw-dust of the Pacific........ 614
- Macfarlan, J. F., Methylated Spirit and some of its Preparations...... 406
- ——— Observations on the Test for Narcotine 312
- Machine, Goodhall's Patent Grinding and Levigating 33
- ——— Napierean 357
- Maisch, J. M., Solution of Gutta Percha 142
- Major and Minor Examinations, Candidates who have passed, *see* Examinations, Major and Minor, &c.

PAGE
Manchester Pharmaceutical Association :
  Award of Prizes 362
  Election of Officers 21
  Exhibition of Drugs, &c., from India 460
  First Meeting of 318
  Introductory Lecture by D. Stone 284
Mannite, Production of, by Marine Plants (T. L. Phipson) 530
Martius, T., Panna, or Radix Uncomocomo 447
———— Wild Senna 426
Matches, Preparation of 431
Materia Medica, Indian 577
Matthew Robinson, Autobiography of (J. Ince) 580
Meat, Flesh, Preservation of (G. Hamilton) 17
Medical Bill for 1856, the Last Edition of 3
———————— 1857, Observations on 441
——— Patronage (E. Wood) 195
——— and Pharmaceutical Jurisprudence 537
——— Relief, Poor Law 489
Medicinal and Physiological Action of Carboazotic Acid (F. C. Calvert and Dr. Moffatt) 167
Medicine, Dispensing of, in the Army 348
———— and Pharmacy in Switzerland 249
———— Stamp, Letter on 45
———— State of, in Persia 143
———— in Turkey 44
Medicines, Poisonous, Tampering with 579
Meeting of the British Association for the Advancement of Science, Twenty-Sixth (Cheltenham)...... 176
Meetings of Council of the Pharmaceutical Society 12, 496
  See also Council of the Pharmaceutical Society. Meetings of
Meetings, Liverpool Chemists' Association ...17, 281, 318, 359, 415, 458, 509, 550, 600
  See also Liverpool Chemists' Association, Meetings of
Meetings of the Manchester Pharmaceutical Association 21, 284, 318, 362, 460
  See also Manchester Pharmaceutical Association, Meetings of.
Meetings of the North British Branch of the Pharmaceutical Society ...160, 281, 316, 356, 406, 445
  See also North British Branch of the Pharmaceutical Society, Meetings of.

PAGE
Meetings of the Pharmaceutical Society...12, 266, 304, 398, 447, 496, 540
  See also Pharmaceutical Society, Meetings of.
Meetings of the Phytological Club 316, 353, 405, 454, 507, 600
  See also Phytological Club, Meetings of.
Members, Associates, and Apprentices, List of 49, 119, 266, 353, 446, 496, 540 589
Mercurial Minimum Thermometer 330
Mercury, Behaviour of, in Thermo-Electric Batteries, *with cut* (W. Symons) 285
Meteorological Report (Mr. Copney) 432, 479
Methylated Spirit and some of its Preparations (J. F. Macfarlan)... 406
———————— Sweet Spirit of Nitre from.............................. 453
Microscopical Examination of some Tissue found in Coal (J. T. Tupholme) 454
Milk, Composition and Analysis of 135
—— Desiccated, Grimwade's 354
Mohr, F., Crystallized Hydrate of Barytes 309
Molybdic Acid, Preparation of from Molybdium Glance 567
Monarda Didyma, Colour Substance of 476
Morphia, Acetate of, Solution of, Decomposition of (E. Wood) 531
———— Suicide from 622
Moss, W. A., Botany of the Crimea 163
Museum of Applied Science, Liverpool.. 342
Museum of the Pharmaceutical Society, Donation to, by W. Procter, jun.................................... 153
—————————— Donations to. *See* Donations to the Museum of the Pharmaceutical Society.

Napierean Machine 357
Narcotine, Test for, Observations on (J. F. Macfarlan) 312
Newbauer, C., Catechu and its Acids 39
Nevins, Dr., General Properties of the Rivington Water 600
———————— Slow Poisoning by Antimony 415
Nichols, H., Letter on the Sale of Poisons 621
Nitrate of Potash, Decomposition of by Charcoal (A. Vogel, jun.)...... 529
Nitre, Sweet Spirit of, Effects of when Inhaled (D. R. Brown)...... 455
——————————— from Methylated Spirit........................ 453

PAGE
North British Branch of the Pharmaceutical Society :
  Address by Mr. Robertson......... 316
  Annual Dinner........................ 548
  Annual Meeting, Report, &c....... 547
  Award of Prizes 547
  Donation of Specimens of Caffeine and Aloine, by Messrs. T. & H. Smith................ 317
  Effects of Sweet Spirit of Nitre when Inhaled (D. R. Brown)... 455
  Improved Method of Coating Pills (H. C. Baildon) 546
  Manufacture of Iron (S. Macadam) 356
  Methylated Spirit and some of its Preparations (J. F. Macfarlan) 406
  Napierean Machine................. 357
  Notice of some French Pharmaceutical Specialities (D. S. Kemp) 545
  Notice of Lectures by S. Macadam 281
  Notice of Meeting of Board of Examiners........................ 358
  Present State of Pharmacy in America (J. Rae)................. 412
  Strychnia, Detection of (S. Macadam) 547
  ——— Lecture on (S. Macadam) 120
  ——————— Supplement to (S. Macadam) 160
Notices of Books, *see* Reviews.
Nuisances arising from Tallow and Soap Works.......................... 567

Oak Galls, English (Dr. Vinen) ... 137
Oberlin, L., Pre-existence of Colchicine in the Seeds of Colchicum 529
Obituary : Dr. Paris 390
——— Dr. Andrew Ure 437
Odontological Society, Constitution and Bye-Laws of...................... 342
——————— Council and Officers of 390
Oil of Bitter Almonds and Laudanum, Suicide by 341
——————— Poisoning by (H. Hopley)........................... 291
——————— Suicide by... 294
—— of Cotton Seed and Oil of Pignut Hickory (Mr. Wayne) 334
—— Egusé, a new Vegetable Product from West Africa (W. F. Daniell).......... 307
—— Wood 44
——— Note on (M. Guibourt) 332
——————— (J. E. de Vry) 373
Oils and Fats, Treatment of 332
Oleine and Stearine, Production of 429
One Thing Forgotten 319
Opium, Poisoning by, in China...... 340
Opium, Poisoning with 341
——— Suicide by 485
Organic Acids in Mineral Waters... 475
——— Substances, Testing of, by Chromate of Potash and Sulphuric Acid (M. Eboli) 140
Oxalate of Lime, Solubility of in Phosphoric Acid 475
Oxide of Lead, Estimation of......... 475
——— Zinc, Observations on (T. N. R. Morson) 17
Oxides of Nitrogen, Action of, upon Iodide of Potassium and Starch .. 432
Ozone, Constitution and Properties of 169

Palmer's Trial and the Result, Remarks on 5
Panna, or Radix Uncomocomo (T. Martius) 447
Para Nut Oil 173
Paracyanogen 172
Parchment-Paper 612
Paris, Dr., Death of..................... 390
Parliamentary Inquiry into the Adulteration of Food, Drugs, &c., Result of, Remarks on 153
Patents for Coating Pills, Letter on (A. H. Cox)........................ 621
Paste, Tooth, Coral............. 48
Patronage, Medical (E. Wood) 195
Paul, B. H., Results of Physical and Chemical Investigation, and Application in the Arts :
  Action of Heat upon Sulphocyanide of Potassium 173
  Action of the Oxides of Nitrogen upon Iodide of Potassium and Starch 432
  Action of Water upon Glass 376
  Adipocire 173
  Allotropism of Selenium............ 169
  An Improved Wash Bottle 175
  Application of Town Refuse and Sewage for Agricultural Purposes 608
  Artificial Production of Urea ... 173
  Assay of Galena and Sulphide of Antimony 176
  Black Ink.............................. 568
  Carbonic Oxide 174
  Casein Cement.......... 223
  Chemical Relations of the Halogens.................................. 566
  Cobalt Green 223
  Colour Substance of Monarda Didyma............................. 476
  Composition of Veratria............ 172
  Constitution and Properties of Ozone.................................. 169
  Consumption of Soap 567

PAGE

Paul, B. H., Results of Physical and Chemical Investigation, and Application in the Arts:
  Crystalline Form, &c., of Selenium and Iodine........................... 375
  Decomposition of Uric Acid in the Animal Organism............ 377
  Description of a Self-Acting Washing Bottle 475
  Detection of Arsenic and Antimony 377
  Detection of Cotton in Woollen Fabrics 476
  Equivalent of Antimony............ 171
  Estimation of Acids in Coloured Liquids 429
  ——————— Copper 176
  ——————— Oxide of Lead...... 475
  ——————— Phosphoric Acid... 431
  Extraction of Potash from Felspar and similar Minerals 607
  Ferruginous Cement 608
  Formation of Ferricyanide of Potassium 172
  Gold in the Form of Malleable Sponge 476
  Hydraulic Mortar 378
  Influence of Hydrochloric Acid on the formation of Sulphides 174
  Lactic Acid in Extract of Taraxacum 172
  Lake Colours 331
  Law of Absorption for Ammonia 374
  Loss of Silver in Cupellation...... 175
  Means of Preserving Solution of Gallic Acid 223
  Means of Preventing the Stoppage of Drain Pipes 378
  Mercurial Minimum Thermometer 330
  Method of Estimating the Density of Solids................................. 374
  Nuisances arising from Tallow and Soap Works 567
  Para Nut Oil............................ 173
  Paracyanogen 172
  Phaseomannite.. 173
  Precipitation of Salts from Solution 330
  Preparation of Alizarine Ink...... 379
  ——————— Alkalimetric Solution.................................. 476
  ——————— Ammonia............ 223
  ——————— Caustic with Gutta Percha 567
  ——————— Coumarine 173
  ——————— Dye Pigment from Quercitron Bark 565
  ——————— Ferrum Reductum 565
  ——————— of Iodide of Potassium 608
  ——————— Matches 431

PAGE

Paul, B. H., Results of Physical and Chemical Investigation, and Application in the Arts:
  Preparation of Molybdic Acid from Molybdium Glance 567
  ——————— Phosphorus (*with cut*).. 175
  ——————— Pyrogallic Acid ... 568
  ——————— Styracine............ 330
  Presence of Cyanogen in Carbonate of Soda 223
  Preservation of Yolk of Egg 222
  Production of Cyanogen Compounds 218
  ——————— Ferrocyanides...... 331
  ——————— Formic Acid 174
  ——————— High Temperatures (*with cuts*) 215
  ——————— Iron (*with cut*) 327
  ——————— Photographs by Artificial Light 223
  ——————— Stearine and Oleine 429
  ——————— Tartaric and Citric Acids 430
  Purification of Alcohol 330
  ——————— Soda from Sulphur 222
  Relations of Gold and other Metals to Light 568
  Root of Chærophyllum Bulbosum 568
  Salts of Sesquioxide of Manganese 172
  Separation of Fat from Soap Suds 429
  Soap 331
  Solubility of Oxalate of Lime in Phosphoric Acid 475
  Specific Heat of Elementary Substances 168
  Stopper for Bottles 332
  Substitute for Felspar in the Manufacture of Porcelain 476
  Testing for Iodine in Water 174
  Treatment of Fats and Oils 332
  Volumetric Analysis 432
  ——————— Process for the Detection of the Adulteration of Potashes and Common Salt ... 476
  Vulcanized Caoutchouc 331
Pecuniary Value of Human Life .. 532
Penghawar Djambi, the new Styptic (T. C. Archer) 322
  ——————— D. Hanbury 278
Pepper, Adulterated, Fine for Selling 199
Pepsine (W. S. Squire) 472
  ——————— Letter on (H. Parker)....... 621
Petitjean's Process for Silvering Glass, &c., Lecture on (Prof. Faraday) 149
Pharmaceutical and Medical Jurisprudence 537
Pharmaceutical Chemists, Privileges of 587

PAGE
Pharmaceutical Meetings:
  Donations to the Library 12
  Address by the President (Mr. Bell) 12
  Distilled Waters of the Pharmacopœias (Mr. Haselden) 14
  Discussion on the above 15
  Rhatany Root 16
  Oxide of Zinc 17
  Donations to the Library and Museum 266
  Distribution of Prizes 266
  Questions for Examination in Chemistry and Pharmacy 267
  ——————— in Botany 267
  Succinct Description of a Collection of American Drugs presented by Mr. W. Procter, jun. 268
  Duroy's Anæsthesimeter, *with cut* (E. Wood) 274
  Detection and Quantitative Estimation of Quinine and other Alkaloids when combined with Fatty Oils (W. Bastick) 277
  Fly Papers 278
  Penghawar Djambi, a New Styptic (D. Hanbury) 278
  Donations to the Library and Museum 304
  Characters of Dandelion Root, and the Means whereby it may be Distinguished from other Roots, *with cut* (R. Bentley) 304
  Egusé Oil, a new Vegetable Product from West Africa (W. F. Daniell) 307
  Crystallized Hydrate of Barytes (F. Mohr) 309
  Root of Aconitum Heterophyllum, Letter on (T. Thomson) 309
  Test for Narcotine 312
  Sale of Poisons, Discussion on ... 313
  Donations to the Library and Museum 398
  Cœlocline Polycarpa, the Beberine or Yellow Dye Tree of Soudan, *with cut* (W. F. Daniell) 398
  Quinidine (J. E. de Vry) 401
  Iodide of Antimony 402
  Extract of Liquorice 403
  Remarks on the Foregoing 405
  Panna, or Radix Uncomocomo, the Cormus of Asphidium Athamanticum (T. Martius) 447
  Detection of Strychnia in Cases of Poisoning (J. E. De Vry) ... 448
  Discussion on the Foregoing 451
  Sesquioxide of Iron used in Medicine 452
  Sweet Spirit of Nitre from Methylated Spirit 453

PAGE
Pharmaceutical Meetings:
  Donations to the Library and Museum 496
  Toxicology of Strychnine (J. E. D. Rodgers and G. H. Girdwood) 497
  Urari, or Arrow Poison of the Indians of Guiana (Sir R. H. Schomburgk) 500
  Donations to the Library and Museum 540
  Detection of Strychnia when Administered in Doses less than sufficient to cause Death 541
  Preparations of Arsenic employed in Medicine 541
  Discussion on the Foregoing 542
  Knight's Soda-Water Apparatus for Aerating Liquids (*with cut*) 548
Pharmaceutical Society, Approaching Anniversary of 539
——————— Council of, on the Education of Dispensers of Medicine and the Sale of Poisons 263
——————— Educational Functions of 492
——————— North British Branch of, *see* North British Branch of the Pharmaceutical Society
——————— Registers of, Remarks on 105
——————— Sixteenth Anniversary of 591
——————— Transactions of, *see* Transactions of the Pharmaceutical Society
——————— Victoria ... 619
——————— Specialities, French, Notice of some (D. S. Kemp) 545
Pharmaceutists, Rising Generation of 261
Pharmacopœia, Dublin, Angular Bottles and Pots ordered in 289
——————— Supplement to (J. Gratten) 289
——————— Committee:
  Information required respecting various Pharmacopœia Preparations 353
Pharmacy in America (J. Rae) 412
——————— America 297
——————— Austrian, Extracts from (J. Ince) 571
——————— in Birmingham, Progress of 109
Pharmacy in the Crimea:
  Letter relative to (H. T. Watts)... 45
  ———————(G. H. Smeeton) 46
  ———————(J. W. N. Brewer)... 47
Pharmacy in Durham 580
——————— Italy—the Limitation of the Number of Shops—the Sale of Poisons 205

PAGE

Pharmacy, the Licence in 156, 201
——— in France and Great Britain, a Passing Sketch of the State of 201
——— and Medicine in Switzerland 249
Phaseomannite 173
Phipson, T. L., Production of Mannite by Marine Plants 530
Phosphoric Acid, Estimation of 431
Phosphorus, Preparation of 175
Photographs, Production of by Artificial Light 223
Physical and Chemical Investigations, Results of, &c. (B. H. Paul), *see* Paul, B. H., Results of Physical and Chemical Investigations
Phytological Club:
  Circulation of Sap (Mr. Grundy) 353
  Donations to 316, 600
  Election of Officers 406
  Fourth General Annual Meeting 405
  Fossil Vegetation of the Coal Measures (T. Greenish) 507
  List of Genera of which the Herbarium is Deficient 508
  Microscopical Examination of some Tissue found in Coal (J. T. Tupholme) 454
  Notice of Meeting of 281
  Proposed Excursion to Richmond 600
  Report on the Botanical Excursion to Dartford 316
  Specimens of Vincetoxicum Nigrum, and Indian Galls 316
Pickrick 344
Pills, Coating of, Patents for, Letter on (A. H. Cox) 621
——— New Method of Coating (H. C. Baildon) 546
Plummer, J. T., Mutual Action of Chromic Acid and the Volatile Oils 130
Poisoning by Ammonia 579
——— Antimony 147, 197
——— Slow 415
——— Arsenic 578
——— in China ... 532
——— Unsuccessful Attempt at 196
——— Attempt at, to Witnesses on a Trial 293
——— by Black Drop, Accidental 246
——— The Case of, at Leeds 116
——— by Extract of Belladonna (H. Hopley) 291
——— Laudanum 195, 340, 341
——— and Oil of Bitter Almonds 341
——— Legislation Against .. 254

PAGE

Poisoning by Mistake 623
——— Letter on (T. Barling) 246
——— by Oil of Bitter Almonds (H. Hopley) 291
——— by Opium 341
——— in China .. 340
——— by Prussic Acid, Accidental 484
——— by the Root of Belladonna 579
——— Water Hemlock 578
——— by Strychnia, Accidental 246
——— Detection of (J. E. de Vry) 448
——— Recovery 389
——— by Sulphate of Potash 295
——— by Sulphuric Acid ... 288
Poisonous Medicines, Tampering with 579
——— Property of Animals killed with Strychnia 577
Poison, Legislation against, Remarks on 585
——— Precautions against Accidents from 347
——— Urari, or Arrow, of the Indians of Guiana (Sir R. H. Schomburgk) 500
Poisons, Sale of 117
——— Bill intituled an Act to Restrict and Regulate 616
——— Carelessness in ... 623
——— The Council of the Pharmaceutical Society on 265
——— Discussion on 313
——— in Italy 205
——— (J. Beaton) 257
——— (T. Lowe) 509
——— (J. Roberton) 256
——— Letter on (W. Wilson) 244
——— Letter on (H. Nichols) 621
——— Letter in the *Times* Relative to 257
——— Observations in the *Atlas* respecting 259
Poor Law Medical Relief 489
Poppy, White, and Opium, Pharmaceutical History of (H. S. Evans) 359
Potash, Nitrate of, Decomposition of by Charcoal (A. Vogel, jun.) ... 529
Potass, Sulphate of, Poisoning by... 295
Potassium, Ferricyanide of, Formation of 172
——— Sulphocyanide of, Action of Heat upon 173

PAGE

Preparation of Aluminium, Sodium, Chloride of Aluminium, &c., *with cut* (M. Deville) ... 34
Preservation of Flesh Meat (G. Hamilton) ... 17
Prize, Botanical ... 2
Prizes, Distribution of ... 266
Proceedings under the Apothecaries' Act ... 105
Procter, W., jun., Sassy Bark Tree of Cape Palmas ... 233
Productions of the Rhio Lingga Archipelago (G. F. de Bruyn Kops) 43
Professional Responsibility ... 393
Provincial Transactions, *see* Meetings, Provincial.
Prussic Acid, Accidental Poisoning by ... 484
Pulvis Bismuthi Compositus ... 200
Pump Water ... 26
Pyrogallic Acid, Preparation of ... 568

Questions for Examination in Botany and Materia Medica ... 267
———— in Chemistry and Pharmacy ... 267
Quinidine (J. E. De Vry) ... 401
Quinine and other Alkaloids combined with Fatty Oils, Detection and Qualitative Estimation of (W. Bastick) ... 277
——— Salts, Practical Examination of (R. W. Giles) ... 22

Rae, J., Pharmacy in America ... 412
Raffle for a Druggist's Business ... 48
Red Cinchona Bark, Tree producing, *with cut* (J. E. Howard) ... 207
—— Colour of Bone and Ivory, Method of Imparting (J. C. Kellermann) ... 531
—— Wines, Action of Alum upon... 43
Registered Apprentices, List of, 119, 266, 353, 446, 496, 540
Registers, the, of the Pharmaceutical Society, Remarks on ...1, 105
Rennet, Essence of ... 199
Report of a Committee to consider and Report on the Subject of Home Adulterations (America)... 144
——— of the Committee on Standards for Drugs (America) ... 144
——— of the Council: Financial Statement, &c. ... 593
——— Meteorological (Mr. Copney) 432, 479
——— of the Select Committee of the House of Commons on Adulterations ... 185
Reviews:
The Art of Perfumery (by G. W. Septimus Piesse) ... 391

PAGE

Reviews:
Elements of Chemistry, Theoretical and Practical (by W. A. Miller) ... 583
Floræ Capensis Medicæ Prodromus; or, an Enumeration of South African Plants used as Remedies by the Colonists of the Cape of Good Hope (by L. Pappe) ... 535
Reynolds, R., Alum in Bread ... 558
Rhatany Root ... 16
———— (Dr. Schuchardt) 29, 132
Rhio-Lingga Archipelago, Note on some of the Productions of (G. F. De Bruyn Kops) ... 43
Rising Generation of Pharmaceutists ... 261
Rivington Water, General Properties of (J. B. Nevins and J. B. Edwards) ... 600
Roberton, J., Sale of Poisons, Letter on 256
Rodgers, J. E. D., and G. P. Girdwood, Toxicology of Strychnia... 497
Root of Aconitum Heterophyllum, Letter on (T. Thomson) ... 311
——— Chœrophyllum Bulbosum... 568
—— Dandelion, Characters of, and Means of Distinguishing from other Roots, *with cuts* (R. Bentley) 304
Royal Institution:
Comparative View of the Cleavage of Crystals and Slate Rocks (J. Tyndall) ...192, 237
On the Conservation of Force (Prof. Faraday) ... 533
Notice of Lectures by Mr. Tyndall, Rev. F. D. Maurice, Dr. J. H. Gladstone, and Mr. T. A. Malone ... 533
M. Petitjean's Process for Silvering Glass, &c., Lecture on (Prof. Faraday) ... 149
Ruhmkoff's Induction Coil ... 355

Sale of Poisons, *see* Poisons, Sale of
Salt, T. P., the Vaporateur, Letter on (*with cut*) ... 339
Salts, Precipitation of from Solution 330
—— Quinine, Practical Examination of (R. W. Giles) ... 22
Samuel, W. H., Crystallization... 459
Samuelson, N., Production of Copper from its Ores, &c. &c. ... 509
Sassy Bark Tree of Cape Palmas, *with cuts* (W. Procter, Jun.) ... 233
Sassy Tree of Western Africa (J. Lindley) ... 373
Schomburgk, Sir R. H., Urari or Arrow Poison of the Indians of Guiana ... 500
Schuchardt, Dr., Rhatany Root 29, 132

PAGE
Sea Saw-dust of the Pacific (J. D. Macdonald) 614
—— Water, Existence of Silver in (F. Field) 614
Secretary of the Pharmaceutical Society, Illness of 439
Selenium and Iodine, Crystalline Form of, &c. 375
———— Allotropism of 169
Self-Acting Washing Bottle (*with cut*) 475
Senna, Wild (C. Martius) 426
Sesquioxide of Iron used in Medicine 452
———— Manganese, Salts of... 172
Sewage and Town Refuse, Application of, to Agricultural Purposes... 608
Siam Cardamoms 556
Silver, Loss of, in Cupellation 175
Silvering and Gilding Glass 138
Sixteenth Anniversary of the Pharmaceutical Society 591
Skeletons of Leaves 152
Smeeton, G. H., Letter relative to Pharmacy in the Crimea 46
Smith, T. and H., Hydride of Amyle 604
Soap, Consumption of 567
—— Improvement in the Preparation of 331
Society of Dentists, Public Meeting of 343
—— Odontological, Constitution and Bye-Laws of 342
Soda, Purification of, from Sulphur 222
Soda-Water Apparatus for Aerating Liquids, (Knight's) *with cuts* 543
Sodium, Explosive Action of, on Water (T. W. Griffin) 141
—— Position of, in the Thermo-Electric Scale (G. Gore) 321
Solubility of Bone in Water 142
Solution of Gutta Percha (J. M. Maisch) 142
Spirit, Methylated, and some of its Preparations (J. F. Macfarlan) ... 406
Spiritus Etheris Nitrosi 409
Spontaneous Combustion (?) ...198, 243
Squire, W. S., Pepsine 474
State of Medicine in Persia 143
Stearine and Oleine, Production of... 429
Steel and Iron, Manufacture of without Fuel (W. Bessemer) 182
Stenhouse, J., Decolourizing Charcoals, and their Power of Absorbing some of the Gases 363
———— Determination of the Amount of Theine in Guarana ... 212
Stopper for Bottles, Patent (*with cut*) 332
Storax (D. Hanbury) 417, 461
—— Liquid, Preparation of 461
Strychnia, Accidental Poisoning by 246
—— Brucia, &c., Testing for (J. Horsley) 177

PAGE
Strychnia and Brucia, Method of Extracting from Nux Vomica without Alcohol (J. Horsley) 179
—— Camphor an Antidote to (D. Wilson) 486
—— Chemical Tests for (W. Copney) 23
—— Detection of, in Cases of Poisoning (J. E. De Vry) 448
—— Detection of, when Administered in Doses less than sufficient to Cause Death 541
—— Experiments on Animals with, and Probable Reasons for its Non-Detection in certain Cases (J. Horsley) 179
—— Lecture on (J. B. Edwards) 20
———— (S. Macadam) 120
———— Supplement to (S. Macadam) 160
—— New Method of Instituting *post-mortem* Researches for (J. Horsley) 181
—— Poisoning by—Recovery... 389
—— Suicide by 485
—— Toxicology of (J. E. D. Rodgers and G. P. Girdwood) ... 497
—— Poisonous Property of Animals Killed with 577
Student's, the, Grievance 345
Studious Habits—the Experiment... 300
Styptic, a New, Penghawar Djambi (T. C. Archer) 322
———— (D. Hanbury) 278
Styracine, Preparation of 330
Sugar, Beet-Root 248
Suicide 622
—— in the City 294
—— by Laudanum 340
———— Attempted...292, 341
———— and Oil of Bitter Almonds 341
—— from Morphia 622
—— Oil of Bitter Almonds ... 294
—— Opium 485
—— Strychnia 485
Sulphate of Potass, Poisoning by ... 295
Sulphocyanide of Potassium, Action of Heat upon 173
Sulphur in Coal Gas, Effects of the Presence of (F. W. Griffin)...166, 323
———— (L. Thompson) 286, 379
Sulphuric Acid, Poisoning by 288
Sweet Spirit of Nitre, Effect of when Inhaled (D. R. Brown)...... 455
———— from Methylated Spirit 453
Symons, W., Behaviour of Mercury in Thermo-Electric Batteries (*with cut*) 285
Syrupus Ferri Iodidi 143

PAGE

Tallow and Soap Works, Nuisances arising from ... 567
Tartaric and Citric Acids, Production of ... 430
Testing for Brucia, Strychnia, &c. (J. Horsley) ... 177
——— of various Organic Substances by Chromate of Potash and Sulphuric Acid (M. Eboli) ... 140
Théine in Guarana, Determination of the Amount of (J. Stenhouse)... 212
There is no Time (A. F. Haselden)... 384
Thermometer, Mercurial Minimum 330
Thomson, R. D., Water—Wells (Report, May 10th) ... 27
Thompson, L., Effects of the Presence of Sulphur in Coal Gas 286, 379
——— T., Root of Aconitum Heterophyllum, Letter on ... 311
Time, the Value of, Letter on ... 385
Tooth Paste, Coral ... 48
Toxicology of Strychnia (J. E. D. Rodgers and G. P. Girdwood) ... 497
Transactions of the Pharmaceutical Society ...12, 119, 263, 304, 353, 398, 446, 495, 540, 589
——— Provincial, *see* Meetings, Provincial
Tree, Sassy Bark, of Cape Palmas, *with cuts* (W. Procter, Jun.) ... 233
——— of Western Africa (J. Lindley)... 373
——— producing Red Cinchona Bark, *with cut* (J. E. Howard) ... 207
Trenerry, W., Letter on the Appointment of Pharmaceutist to the Bristol Royal Infirmary ... 147
Tupholme, J. T., Microscopical Examination of some Tissue found in Coal ... 454
Tyndall, J., Comparative View of the Cleavage of Crystals and Slate Rocks ...192, 237

Unguentum Hydrargyri (J. Higginbottom) ... 214
Urari, or Arrow Poison of the Indians of Guiana (Sir R. H. Schomburgk) ... 500
Ure, Dr. Andrew, Death of ... 437
Urea, Artificial Production of ... 173
Uric Acid, Decomposition of in the Animal Organism ... 377

Valerianate of Zinc... 248
Value of Time, Letter on ... 385
Vaporateur, The, Letter on, *with cut* (T. P. Salt) ... 339
Vegetation, Fossil, of the Coal Measures (T. Greenish)... 507
Veratria, Composition of ... 172
Vinen, Dr., English Oak Galls ... 137
Vogel, A., jun., Decomposition of Nitrate of Potash by Charcoal ... 529
Volumetric Analysis... 432
——— Process for the Detection of the Adulteration of Potashes and Common Salt... 476
Vry, J. E. de, Detection of Strychnia in Cases of Poisoning ... 448
——— Note on Wood Oil ... 373
——— Quinidine... 401
Vulcanized Caoutchouc ... 331

Wagner, R., Casein Cement ... 288
Wash Bottle, Improved ... 175
Water, Action of upon Glass... 376
——— Hemlock, Root of, Poisoning by 578
——— Pump ... 26
——— Wells—Report, May 10th (R. D. Thomson)... 27
Waters, Distilled, of the Pharmacopœias (A. F. Haselden) ... 14
Watts, H. T., Letter relative to Pharmacy in the Crimea ... 45
Wayne, Mr., Oil of Cotton Seed and Oil of Pignut Hickory ... 334
Weights, Illegal—the Westminster Stamp and Westminster Law ... 108
Wheat Grain, some Points in the Composition of, its Products in the Mill, and Bread (J. B. Lawes and J. H. Gilbert) ... 561
White Poppy and Opium, Pharmaceutical History of (H. S. Evans) 359
Wild Senna (C. Martius) ... 426
Wilson, D., Camphor an Antidote to Strychnia... 486
——— W., Letter on the Sale of Poisons ... 244
Wines, Red, Action of Alum upon... 43
Wood, E., Adulteration of Calamina Præparata... 388
——— Duroy's Anæsthesimeter (*with cut*) ... 274
——— Decomposition of Solution of Acetate of Morphia... 531
——— Medical Patronage... 195
Wood Oil, or Kruing ... 44
——— Note on (M. Guibourt) ... 332
——— (J. E. de Vry)... 373
Wright, C. W., Liquidamber Styracifluæ... 336
Writing Ink in Cakes ... 531

Yellow Dye Tree of Soudan, *with cut* (W. F. Daniell) ... 398
Yolk of Egg, Preservation of... 222

Zinc, Valerianate of ... 248

END OF VOL. XVI.

C. WHITING, BEAUFORT HOUSE, STRAND.